WHY YOU NEED TO KNOW THE DIFFERENCE BETWEEN A PUZZLE AND A MYSTERY p. 98

Smithsonian

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{ JUNE 2007 }

PETRA

New thinking about Jordan's mesmerizing 2,000-year-old Rock City

Extreme Origami
Our Photo Contest Finalists
Romania's Painted Monasteries
Jimmy Carter Takes on Malaria
A Slave Trader Gets His Comeuppance
Grand Teton National Park: Grander Still

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Smithsonian features

{ JUNE 2007 · VOLUME 38, NUMBER 3 }

FINALIST, TRAVEL

DIANA LEMIEUX, AGE 31
BROOKLYN, NEW YORK

PHOTOGRAPHED SEPTEMBER 2006

Lemieux took this self-portrait while on vacation in Death Valley, California, last summer. She says the day was so hot there were no cars on the road, allowing her to stride down the centerline. "I guess New York City was kind of my inspiration in a strange way," she says. There, "I'd either get run over or there would be other people in the photos."

42 Reconstructing Petra

New excavations at the mysterious 2,000-year-old Jordanian site are turning up unexpected evidence of a lavish city with temples, spas, gardens and villas

BY ANDREW LAWLER

50 Prize Pictures

It wasn't easy selecting six winners and five runners-up from the more than 8,000 images submitted to our 4th Annual Photo Contest. But we did it, and here they are

58 Captain Gordon's Infamy

When Nathaniel Gordon set sail for Africa on a slaving voyage in 1860, he had little reason to fear arrest or punishment. But a sea change lay dead ahead

BY RON SOODALTER / ILLUSTRATIONS BY STAN FELLOWS

66 Jewel of the Tetons

This summer, with the Rockefeller family's long-awaited donation of a 1,106-acre ranch to the Wyoming national park, one of Jackson Hole's most sublime wilderness parcels will finally open to the public

BY TONY PERROTTET

74 Into the Fold

Combining advanced mathematics and old-fashioned dexterity, physicist Robert Lang is revolutionizing the ancient art of origami with seemingly impossible works

BY BETH JENSEN

80 Scripture Alfresco

Designed to dramatize the Bible for the peasantry, elaborate 450-year-old paintings that adorn monasteries and churches in Romania are once again a must see

BY ANDREW CURRY

86 The Ethiopia Campaign

At 82, Nobel Peace laureate and former president Jimmy Carter has taken on his most ambitious public health project yet: subduing Africa's leading killer—malaria

BY ROBERT M. POOLE / PHOTOGRAPHS BY ANTONIO FIORENTE

COVER: No one knows why the ancient builders of Petra carved so many facades (the Khazneh, or Treasury Building) from the city's rock walls. Photograph by Johanna Huber / SIME / gigiamarchiori.com.

Smithsonian departments

{ JUNE 2007 · VOLUME 38, NUMBER 3 }

Photographer LeRoy Grannis was there in the 1930s and '40s, when a few hundred young men in California and Hawaii with heavy redwood boards represented surfing's Camelot.

"ENDLESS SUMMERS," PAGE 18

Grannis began covering the sport of surfing just as it started to swell in popularity (Kent Layton hangs ten off the California coast, October 1969). Photograph by LeRoy Grannis.

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18 INDELIBLE IMAGES
ENDLESS SUMMERS
In surfing photographs taken over 50 years, LeRoy Grannis caught a wave—and captured a culture
BY OWEN EDWARDS

24 POINTS OF INTEREST FIELDS OF DREAMS
If Gary Greff built whimsical, giant metal sculptures along the two-lane highway leading to his struggling hometown of Regent, North Dakota, would they come?
BY REED KARAIM

98 PRESENCE OF MIND RISKS AND RIDDLES
To survive in today's ever more complex world, we should learn how to distinguish between mysteries and puzzles
BY GREGORY F. TREVERTON

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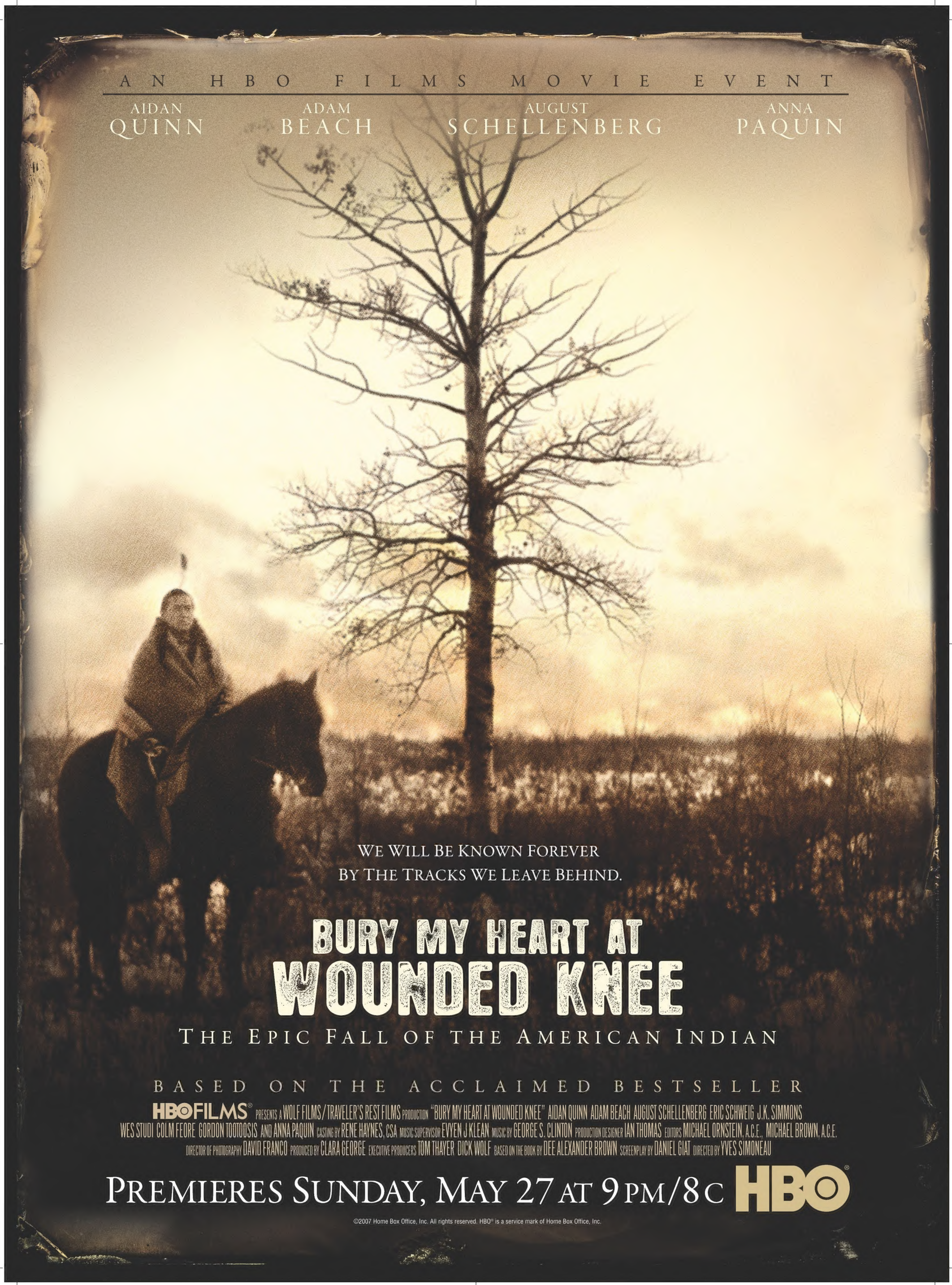
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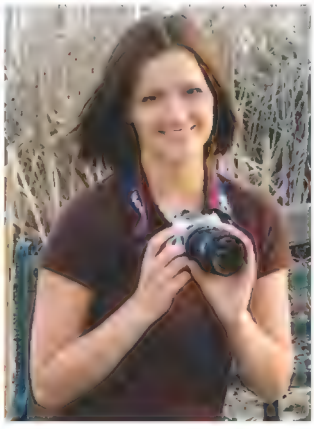
FROM THE EDITOR

Making Connections

Looking for sunrises and guiding lights

BY CAREY WINFREY

YOU MIGHT SAY that 18-year-old Joelle Linhoff, our photo contest grand prize winner, was born to the camera: her mother teaches photography at Minneapolis Southwest High School in Minneapolis, Minnesota, and her father owns a photo lab in that city. "I've grown up around it," says Linhoff, who graduates this month from Hopkins High School in Minnetonka, Minnesota, and plans to study chemical engineering next fall at the University of Minnesota. "I had a little bit of an advantage in the contest." Linhoff's winning entry is a staggeringly romantic photograph of horses grazing in a pasture beneath majestic trees on a foggy New Zealand dawn ("Prize Pictures," p. 50). She took it two summers ago while visiting the area with a Christian youth missionary group called Global Expeditions. Linhoff began photographing the pasture on the first day that the group bunked at a nearby camp. "Finally, on the third day, I woke up early to get the sun right. There were normally cows out in the pasture, but I took [the winning photograph] the only morning there were horses. During the day it's a gorgeous valley, but the sunrise really brought something special to it." We agree.



Linhoff: "A little bit of an advantage."

OWEN EDWARDS is represented twice in this issue, as the author of an "Object at Hand," about a man who made airplanes that did not fly ("Flights of Fancy," p. 37), and "Indelible Images," about a man who may be the world's greatest surfing photographer ("Endless Summers," p. 18). "I knew LeRoy Grannis' work, but while I have friends who are surfers, I've never gotten into surfing," says Edwards. "He's close to 90, and he surfed until he was 85. I collect guys like that as guiding lights."

Edwards, who writes most of our "Object at Hand" columns, says the key is in finding a personal connection. He may not hang ten, but Edwards, who is 69 and lives in San Francisco and Sonoma, California, is no slouch when it comes to derring-do; he likes nothing better than taking high-speed laps on one of the two classic Ducati motorcycles he owns. For this issue, Edwards tracked down Jonathan Green, who rescued, from obscurity, the fantastical nonflying machines of the late folk artist Leslie Payne. "Jonathan Green brought these things out of weed-overgrown oblivion at considerable cost and energy and labor," says Edwards. "There's always a hero in 'Object'—the person who made a discovery or took the effort to save something and preserve it at the Smithsonian Institution."

MONICA LINHOFF

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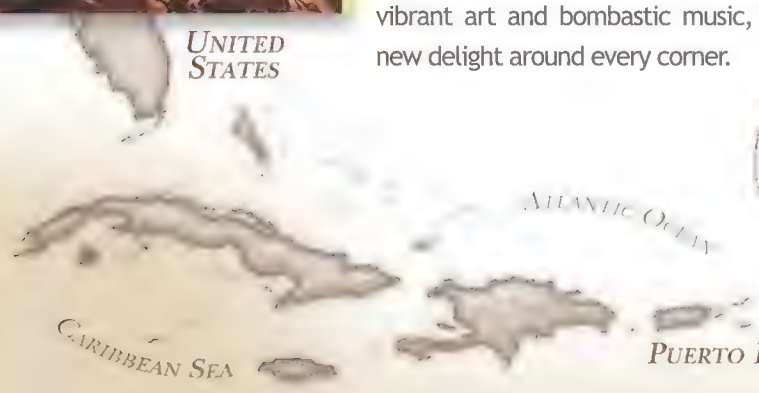

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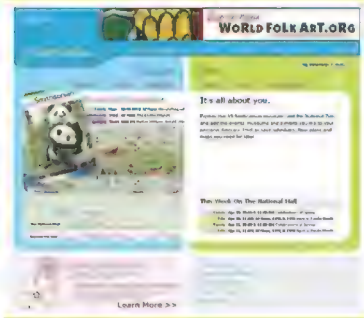

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LETTERS READERS RESPOND TO THE **APRIL** ISSUE

"Barbaro's Legacy" helped me understand the many steps taken to save this beautiful champion racehorse. I'm pleased that Barbaro's owners tried so hard to save him, and have so graciously donated funds for research to better understand the horrible disease of laminitis that hampered his recovery and has afflicted so many other horses.

BERTHA NOVACZYK, GLENVIEW, ILLINOIS

FALLEN CHAMPION

BARBARO WAS obviously a force of nature with not only his great physical abilities but also a spirited personality that seemed to shine through the drugs, pain and stress. When he died, I felt sympathy for the veterinarian and his staff, because the death of an animal one has become close to is heartbreaking. After reading the article, I no longer feel such sympathy. Dr. Richardson implies that the few people who urged early euthanasia for the injured horse were ignorant. But Barbaro should have been put out of his misery much sooner.

MONIKA BAWDON
DENVER, COLORADO

WHAT DID BARBARO teach us? That the sport of kings is really a barbaric blood sport, no better than bearbaiting or cockfighting. It may be a majestic sight to see horses thundering down the backstretch, but each animal is only a misstep away from disaster. The casualty rates prove that these heavy beasts are being pushed far beyond the limits of their spindly legs, with all too frequent appalling results. I, for one, would not mourn the passing of this "sport."

PHIL M. PERRY
BEARSVILLE, NEW YORK

THANK YOU FOR Steve Twomey's touching and informative piece. The

We don't know when childhood ends,

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moment I heard Barbaro's name (it means fierce or reckless in Spanish), I knew he was going to do whatever it took to win the Kentucky Derby. I was upset by the decision to put him down. But after reading your piece and learning that three of his hooves had laminitis and his broken leg had developed an abscess, I realized it was impossible to save him. Now it won't be so painful when I look at his picture in my library.

DELIA VARGAS
BOWIE, MARYLAND

REDISCOVERING ALEXANDRIA

MY HEART SANK as I read "Raising Alexandria." The author, Andrew Lawler, almost skips over the city's Christian period, moving from the Ptolemies to Islam—seven centuries!—in a blink. He briefly returns to Christian Alexandria as he discusses the murder of the pagan intellectual Hypatia. Throughout, he treats Alexandrian Christianity as if it were an undertow of anti-intellectualism that dragged away the city's culture, writing that early "Christians threatened Alexandria's scholarly culture; they viewed pagan philosophers and learning with suspicion if not enmity." Is he talking about biblical scholars and theologians such as Pantaenus, Clement, Origen? Can he be serious? Alexandria's academic culture was transformed, not destroyed, by Christian schools.

MIKE AQUILINA
BRIDGEVILLE, PENNSYLVANIA

ANDREW LAWLER provides a poignant illustration of the struggle between the needs of urban development in 21st-century Alexandria and the desire to protect its rich archaeological remains. Other cities have experienced this challenge, perhaps the best-known example being Rome itself, another cultural center of Mediterranean antiquity. It's amazing that ancient Alexandria has survived as much as it has despite the onslaughts of a tsunami and competing cultural, political and economic forces.

PAOLO GIACOMONI
COMMACK, NEW YORK

CORRECTIONS:

"Open Sesame" misstated the name of the architect of the House of the Temple in Washington, D.C. He was John Russell Pope.

In "Raising Alexandria," the date Christianity became the official religion of the Roman Empire was misrepresented. It was A.D. 380.

The caption for the photographs on page 68 was inadvertently dropped. Pictured are historians Tim Hitchcock (top) and Robert Shoemaker.

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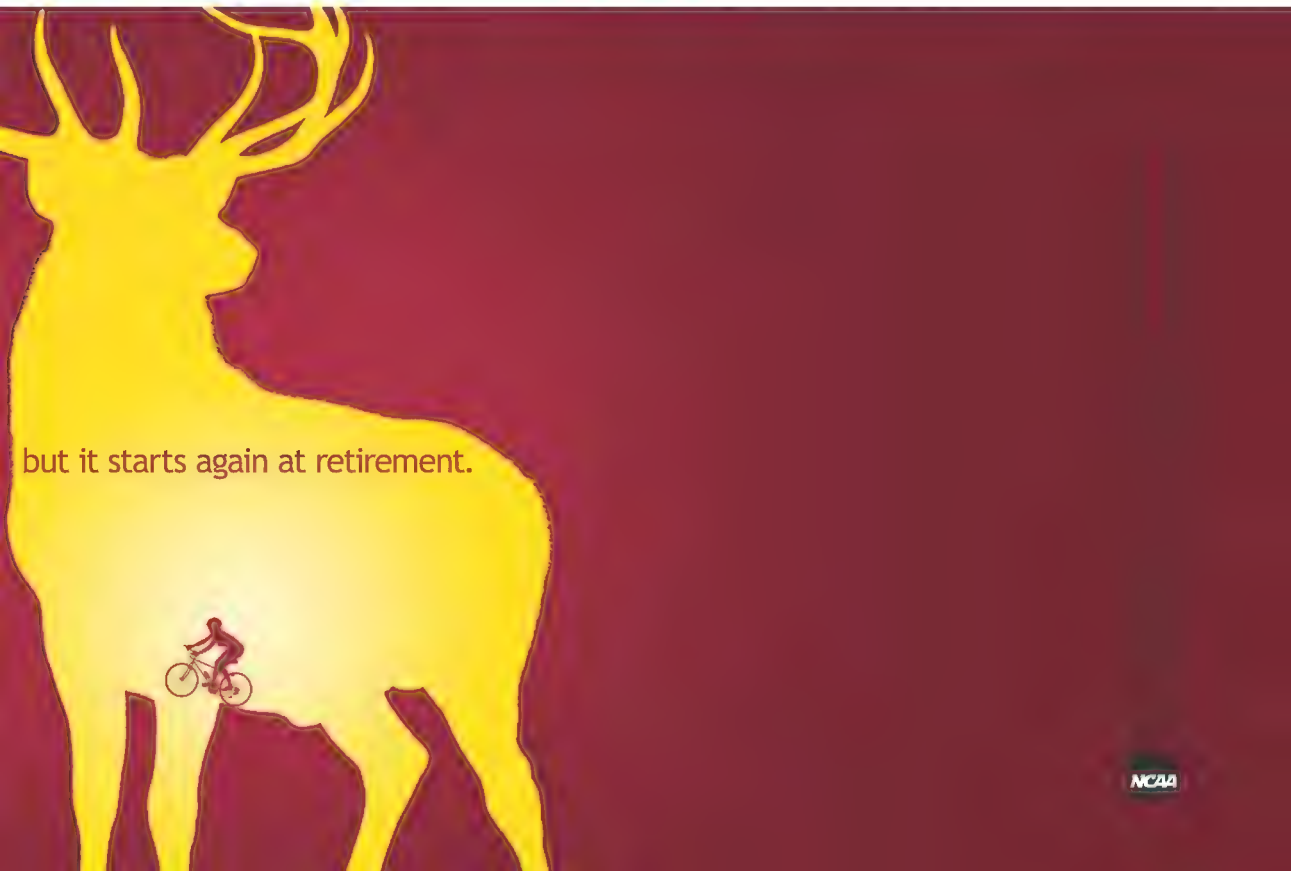


WILD THINGS

LIFE AS WE KNOW IT

OUTFOXED BY CLIMATE CHANGE

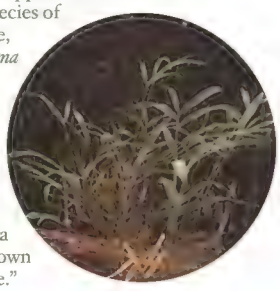
Animals don't always cope with shrinking habitat, say researchers from Stockholm University and other institutions. They compared DNA from modern foxes in Scandinavia and Siberia with DNA extracted from the teeth and bones of ten arctic foxes that lived at different latitudes 12,000 to 19,000 years ago. They found that today's animals are descended from the northernmost arctic foxes. Why? Animals in southern ranges were apparently wiped out when the last ice age ended about 10,000 years ago, shrinking the amount of territory suitable for the cold-loving foxes.

HOW SHARKS HELP SCALLOPS

Great sharks—blacktips, great whites and other species longer than six feet—have been hunted almost to extinction in places. So skates, rays and small sharks are thriving, causing shortages of some of their (and our) favorite foods: oysters and scallops. In fact, according to a new analysis of 35 years of Atlantic wildlife data by researchers at Dalhousie University in Halifax, Canada, and elsewhere, the great shark shortage is to blame for the 2004 closure of North Carolina's century-old bay scallop fishery, among other things.

BAMBOO HUNTING

Scientists have discovered a new species of bamboo—in the southern Appalachian Mountains. There are 1,400 known species of the woody grass worldwide, but *Arundinaria appalachiana* is one of only three native to North America. "It's so exciting to find a new species in our own backyard!" says Lynn Clark of Iowa State University. She helped identify the new bamboo, a deciduous species long known to local people as "hill cane."



A DINOSAUR'S OWN DIGS

Paleontologists have excavated the first known dinosaur burrow. The 95-million-year-old tunnel, in southwestern Montana, held one adult and two juveniles from a new genus and species: *Oryctodromeus cubicularis:* The animal apparently had a shovel-like snout and shoulders specialized for digging. The seven-foot-long adult (much of which was tail) probably dug the six-foot-long burrow, which resembles a rodent or hyena den, to protect its young from predators. The find adds to the growing evidence that some dinosaurs were caring parents.

Observed

NAME: *Chiroxiphia lanceolata*, or the lance-tailed manakin

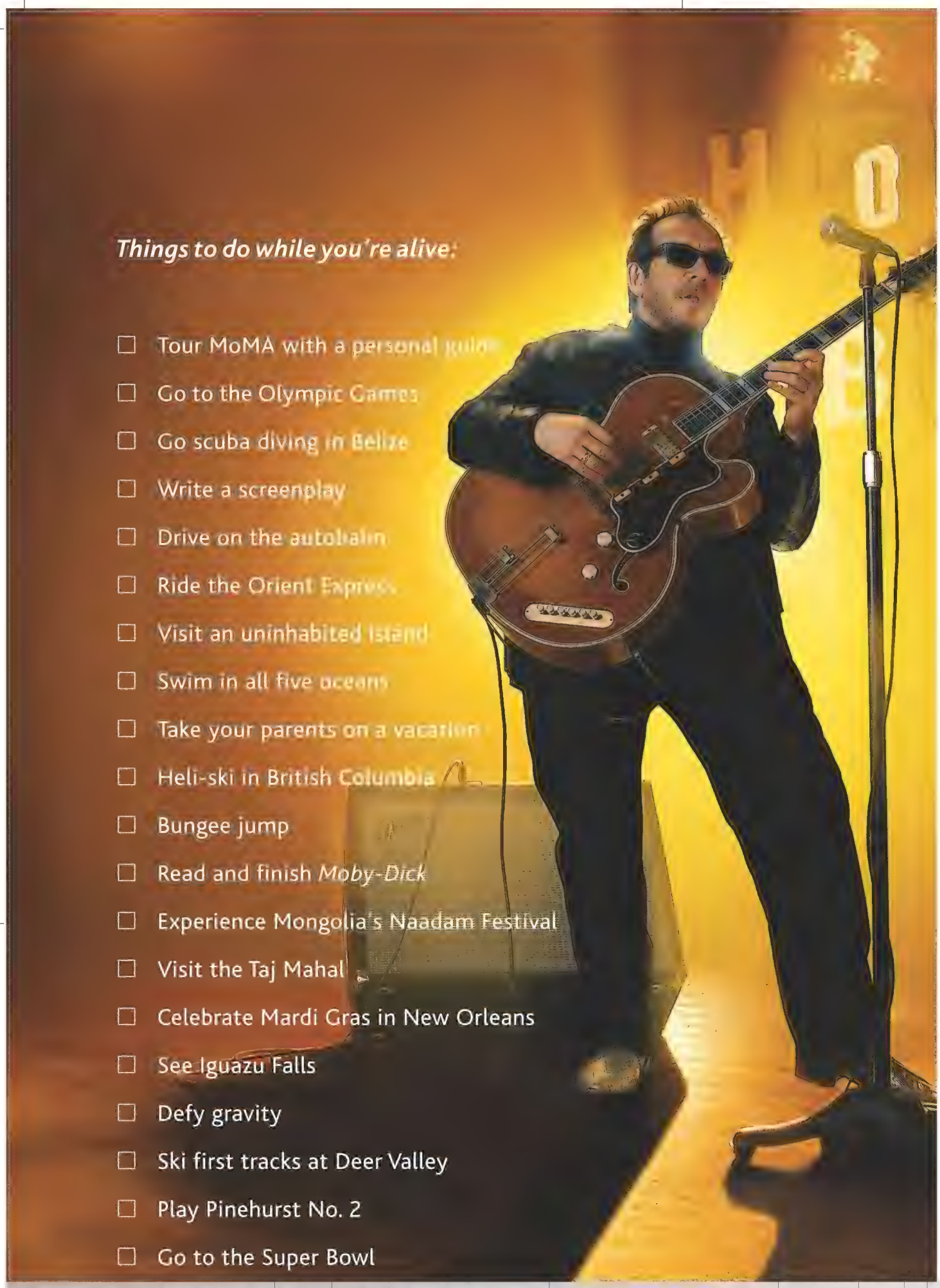
PROVOCATIVE BEHAVIOR: Males court cooperatively—an alpha male uses an unrelated beta male to attract a female, much as a human male might use a buddy as a "wingman" in a bar. Except manakin males dance with each other. And only the alpha gets to mate.

PROVOCATIVE QUESTION: So what's in it for the other guy?

PROVOCATIVE ANSWER: Three motives have been hypothesized, but only one seems to apply. The beta is neither (a) raising his odds of immediate reproductive success nor (b) helping a blood relative carry on the family line. But a new study from the University of California at Berkeley has found that manakin betas (c) do increase their odds of becoming alphas later, and suggests they are serving an alpha apprenticeship.

CHRIS SCHENK / FOTO NATURA / MINDEN PICTURES; FLIP NICKLIN / MINDEN PICTURES; J. TRIPLETT, LEE HALL / MONTANA STATE UNIVERSITY (2); JOHN DUNNING / VIREO

LIFE TAKES VISA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☐ Take your parents on a vacation
☐ Heli-ski in British Columbia
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Louisiana: A Culinary Adventure

Louisiana knows how to serve up a good time, especially at the table. From Creole to Cajun dishes, soul food to seafood, Oysters Rockefeller to oyster po-boys, the menu is as culturally diverse as this legendary state. Here's a guide to the regional specialties that put this palate-pleasing destination on the culinary map.

Greater New Orleans: International Food Capital

Start your day with beignets and café au lait in the French Quarter at Cafe du Monde. Later, savor an exquisitely prepared meal at one of the city's world-renowned restaurants — among them Galatoire's, Brennan's and Emeril's — some of which are helmed by celebrity chefs. Culinary favorites include red beans and rice, grillades and grits, po-boys, and for dessert, bread pudding, pralines or bread pudding with a praline sauce!

Cajun Country: Joie de Cuisine

Richly flavored soups and stews, such as étouffée and gumbo, are a signature of Cajun cooking. Crawfish, a Cajun Country trademark, are ubiquitous on both formal and informal menus, whether fried, boiled, grilled, minced or marinated.

Plantation Country: Grand Dining

Many of the plantation houses along Great River Road now have restaurants that serve "Old South" cuisine, including Poplar Grove in Port Allen, where guests can enjoy private dining and gospel choirs. Baton Rouge has many fine restaurants, inspired by the great cuisine of New Orleans, an hour and a half away. Be sure to try Louisiana favorites such as, jambalaya or barbeque shrimp. Lafitte's Landing at Bittersweet Plantation features indigenous menu items cooked to perfection by John Folse, one of Louisiana's most famous chefs.

Crossroads: Southern Specialties

This is the place to indulge in authentic Southern country cooking — down-home delicacies like fried chicken, barbecue and cornbread are exceptional. No tasting tour is complete without two of the region's most famous dishes: Natchitoches meat pie and Lasyone's Cane River Cream Pie.

Sportsman's Paradise: Freshwater Fish and More

All of the pristine lakes in the region yield a bounty of delicious freshwater fish. Dine on Cajun catfish at Franklin Parish's celebration of the whiskered swimmer. For dessert, mouthwatering peach pie and cobbler are served year-round. Monroe, the home of the Joseph Biedenharn Museum and Gardens, whose namesake was one of the first bottlers of Coca-Cola, is a must stop for the area's unusual and delicious Coca-Cola cake.

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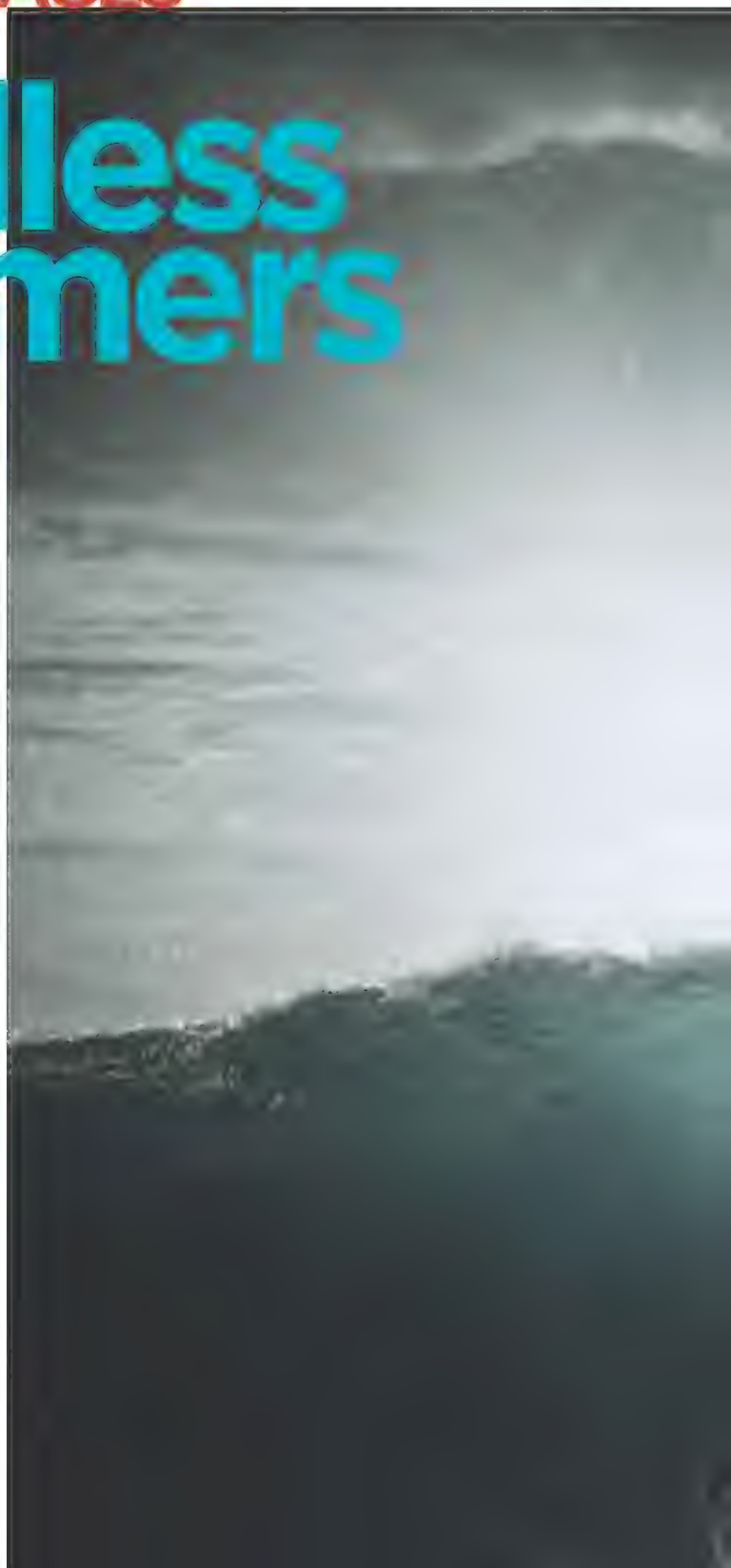
Endless Summers

For almost 50 years, surfing legend LeRoy Grannis has been shooting the curl

BY OWEN EDWARDS

THERE IS AN old surfer taunt: *You should have been here yesterday.* LeRoy Grannis was there in the 1930s and '40s, when a few hundred young men in California and Hawaii with heavy redwood boards represented surfing's Camelot. Portrait photography had Felix Nadar and Mathew Brady. Fashion photography had Baron de Meyer and Edward Steichen. Surfing photography had Grannis and his friend John "Doc" Ball; they set the standard for all the pictures that followed.

Not many sports photographers are major players in the sports they cover, but Grannis was an exception. Born in 1917 a block from the ocean in Hermosa Beach, California, he began surfing in 1931 and became one of the state's top surfers. When I asked recently if he and Ball began their camera careers at the same time, he replied that Ball had started much earlier. "A lot of the time," he added, "he was photograph-



"Into another realm": "Midget" Farrelly surfs the shore break off Makaha, Hawaii, in 1968.

"We had that life for years and didn't know how lucky we were," says Grannis, right, on his long board at Hermosa Beach, California, in 1941, and far right, in 2006. His work shows "Midget" Farrelly, above, off Pupukea, Oahu, Hawaii, in 1970; a wipeout, below right, off Makaha, Hawaii, in 1966, and surfing-contest finalists, bottom, in Hawaii in 1968.

ing *me*." Grannis is featured in more than a half-dozen photographs in Ball's classic 1946 book, *California Surfriders*.

That volume might be considered the Old Testament of surfing photography. Doc Ball (1907-2001)—born John Heath Ball, he acquired the nickname in dental school—started surfing in 1929, when there were, by his estimate, about 20 surfers on the entire California coast. He started taking surf pictures seriously in 1931, capturing the kinetic excitement of the sport. But if Ball was the granddaddy of the genre, "Granny" Grannis would become more than a chip off the old board.

Had it not been for Ball, and a medical doctor recommending, in 1959, that Grannis take up a hobby to relieve the stress of his job as a telephone installer, he might never have bought a 35mm East German camera and started recording the people and places he knew best. The timing, though coincidental, could not have been better.

The novel *Gidget* had come out in 1957, followed two years later by the movie of the same name, with Sandra Dee in the title role. With the Beach Boys singing "Surfin,'" Jan and Dean making Surf City a mythic destination and lightweight boards putting more people on the waves, the early '60s began a surfing boom that has yet to end. "The American dream had relocated to the beach in Southern California," says Matt Warshaw, author of *The Encyclopedia of Surfing*. "In the old days, surfing was a small world, but in the '60s it became the world where everybody else wanted to be."

This enviable situation was not, perhaps, something that most surfers thought much about. "We had that life for years," Grannis says, "and didn't know how lucky we were."

Warshaw notes that Grannis came to photography late and was never a full-time professional, but adds that "he had a good eye, he knew how to compose, and he was totally plugged into the surf scene."

This intimacy gives his pictures of the boys, the girls and the boards the joyful feeling of family photos taken by a particularly talented brother. "He loved what he was doing," says Warshaw. That love can be seen in Grannis' pictures of both the big-wave thrills and the familial comforts—a realm beautifully assayed in the book *LeRoy Grannis: Surf Photography of the 1960s and 1970s*, published last year in a collector's edition and just republished in a popular edition.

"I worked the evening shift at the phone company and surfed in the mornings," Grannis says. Later, when he was able to devote more time to photography and to magazines such as *Surfing Illustrated*, where he was photo editor, and *International Surfing*, which he co-founded, his work became the window on a small world that the wider one found fascinating. Says his photographer colleague, Ben Barnett: "There was a texture about Grannis' shots that for me took them into another realm."

Grannis is now within whispering distance of 90. He had to give up surfing five years ago after a hip replacement, but he still lives near the beach in Carlsbad, California, a little north of San Diego, and he goes down to check out the waves almost every day. When I suggested that he must be a legend among the young surfers he meets these days, he responded, simply: "Yes."

OWEN EDWARDS, *a frequent contributor to* SMITHSONIAN, *is the former exhibitions critic for* American Photographer.

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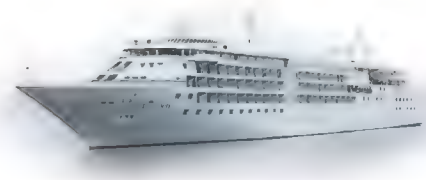

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THIS MONTH IN HISTORY

JUNE ANNIVERSARIES

MOMENTOUS OR MERELY MEMORABLE

BY ALISON McLEAN

170 YEARS AGO
QUEEN FOR 23,225 DAYS

Princess Alexandrina Victoria, 18, ascends to the British throne when her uncle, King William IV, dies June 20, 1837. Professing herself "very young and perhaps in many, though not in all things, inexperienced," Victoria ultimately presides over the expansion of her empire and the increased popularity, if not power, of the monarchy. Her reign, the longest in British history, ends with her death on January 22, 1901.

40 YEARS AGO SIX FATEFUL DAYS

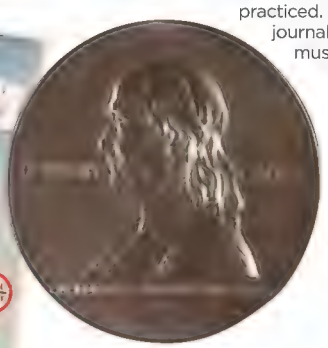
Tensions brewing since Israel became a state in 1948 erupt June 5, 1967, when it and Egypt go to war, each claiming the other invaded. Syria, Jordan and several other Arab states quickly join Egypt. After six days, Israel prevails. Its occupation of the Sinai Peninsula, Gaza Strip, Golan Heights and West Bank—uniting control of Jerusalem—aggravates Arab-Israeli territorial hostilities for decades.

140 YEARS AGO
WRIGHT STUFF

Frank Lincoln Wright is born in Wisconsin June 8, 1867. Trained as an engineer, he learns architecture while working for Chicago master Louis Sullivan, and makes his name—by then changed to Frank Lloyd Wright—with open-plan, hearth-centered "prairie style" houses. Wright's signature spiral Guggenheim Museum (right) is completed after his death in 1959.

90 YEARS AGO EYES ON THE PRIZE

The first Pulitzer Prizes, named for *New York World* owner Joseph Pulitzer (1847-1911), are awarded June 4, 1917. Pulitzer funded them to lift journalism above the "yellow" sensationalism he and competitor William Hearst practiced. Today 21 Pulitzers are awarded each May in journalism, photography, literature, music and drama.



60 YEARS AGO
THE MAN WITH THE PLAN

Secretary of State George Marshall, speaking at Harvard on June 5, 1947, outlines a plan to aid Europe's recovery from World War II. The U.S. will send money for food and the rebuilding of industry if Europe agrees on how to spend it. The program sends some $13 billion over 4 years, and paves the way for future cooperative efforts like the European Union. Marshall wins the Nobel Peace Prize in 1953.

70 YEARS AGO
MEALS ON WHEELS

Oklahoma City grocer Sylvan Goldman introduces the shopping cart in June 1937. Inspired by folding chairs, his two-basket invention—rejected at first by women tired of pushing prams and men afraid of seeming weak—soon has shoppers buying twice as many groceries. Goldman, who later invents a luggage cart, dies in 1984, age 86.

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Fields of Dreams

To help revive his North Dakota hometown, a former high-school principal created giant sculptures to grace a stretch of prairie highway

BY REED KARAIM

GARY GREFF WAS DRIVING across western North Dakota when he came upon a human figure fashioned out of metal and a round hay bale. As he watched a family stop to take a picture of the figure, he saw his future. Having recently left his job as a high-school principal, Greff had returned to his hometown of Regent, a struggling community of some 200 souls tucked into the southwestern corner of North Dakota, to figure out what to do next. Now, he knew.

He pictured giant metal statues every few miles along the road leading from Interstate 94 to Regent, turning a 30-mile ribbon of two-lane asphalt into what he envisioned as an "enchanted highway." He imagined the landscape of brown buttes and treeless pastures becoming home to the nation's ultimate roadside attraction, drawing thousands of tourists and saving Regent from a slow economic death. Greff had never taken an art class or so much as welded a joint. It didn't matter; he went to work. Some 18 years later, the most amazing thing about his story is how close he's come to making his vision a reality.

West of the Missouri, North Dakota becomes a sea of grassland. Trees are rare, towns rarer. The 2000 census identified six North Dakota counties that had lost at least 20 percent of their population during the previous decade. Hettinger County, home to Regent, was one of those, with about 2,700 people spread over more than a thousand square miles.

Greff and I had agreed to meet at *Geese in Flight*, a 110-foot-tall metal statue just off the Interstate. The day was cold and wet. As I headed up the driveway that leads to the huge sculpture, I noticed a line of small metal geese, all pointing the way.

Greff drove up shortly. Now age 58, he's a wiry man with a weathered face, a slightly uncertain smile and the sturdy handshake of someone used to manual labor. "Yaah, this is the one in the *Guinness World Records* book," he said a few minutes later. The sculpture looks large enough from the Interstate, but its true size—taller

"This is going to be the number one tourist attraction in North Dakota," Greff (with his 110-foot-tall *Geese in Flight*) boasts of his Enchanted Highway project. "I really believe it can happen."

DAN KOECK, EL ZABETH WOLF

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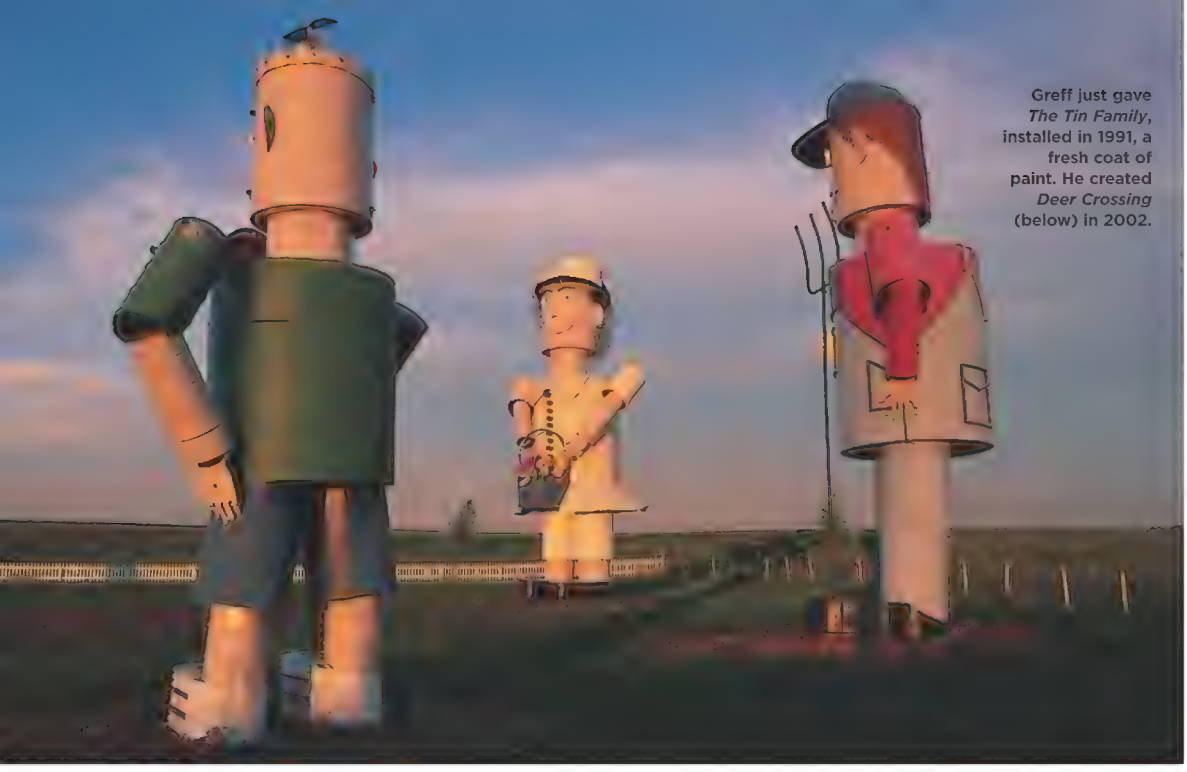

Greff just gave *The Tin Family*, installed in 1991, a fresh coat of paint. He created *Deer Crossing* (below) in 2002.

than a ten-story building, nearly the width of a football field—overwhelms you as you get close. The *Guinness* book calls it the world's "largest scrap-metal sculpture." It's built out of the stuff Greff uses for almost all of his pieces: old oil-well tanks ($400 each) that he runs over with a forklift to flatten, oil-well pipe and other scrap metal.

For nearly two decades, living on almost no income and with little help, he has created sculptures and multiple-part tableaux at six sites leased to him for a dollar by supportive landowners. Other farmers have lent him a flatbed truck and a small crane. Sometimes friends chip in for the big moments, raising the statues and setting them in place. (Installing *Geese in Flight* cost $50,000, most of it for a large construction crane.)

Greff and I drove about three miles down the highway, stopping next at *Deer Crossing* (below)—two deer leaping over a fence—the buck 75 feet tall and 60 feet long. Greff looks uncomfortable when I talk about his work as art—"I guess I have to say I am an artist," he finally agrees. In 1999, People for the Ethical Treatment of Animals asked him to bid on making a statue at their headquarters in Norfolk, Virginia, and in 2003, he was invited to Kaiserslautern, Germany, to do a proposal for a sculpture in the town center. Neither project came to anything—he says both clients were a bit taken aback when he told them how much his work costs in materials and time—but that was OK by him.

From *Deer Crossing*, Greff and I drove down the road to *Grasshoppers in the Field*, *Pheasants on the Prairie*, *Teddy Rides Again* and *The Tin Family*. He has finished six works and is putting the finishing touches on a seventh, *Fisherman's Dream*. Each site is landscaped and has a parking lot, picnic tables and an information board. Most include something children can play on: *Teddy Rides Again* has a handmade stagecoach; *Grasshoppers in the Field*, a jungle gym.

He plans four more sculptures. The next will be a giant spider web, and he wants to create a tribute to Native Americans. But he's not sure after that. He first thought the project would take two years. "I was so naive," he says. "I thought everyone would say, 'Yes, we have to save Regent,' and they'd all get on board and it would just get done."

In fact, there was an initial wave of support. But fatigue set in as the project stretched on. "I think most people here are generally supportive," says Margee Lee Witte, a humor columnist at the local paper, *The Herald*. "But they're like people everywhere; they wait to see what happens, then jump on the bandwagon."

State officials didn't know what to make of Greff at first. But his persistence seems to have won them over. "I think Gary's determination reflects the character of the state," says North Dakota tourism director Sara Otte Coleman. "You don't see a lot of quitters around here." Coleman's department promotes the Enchanted Highway (now its official name), and the state provided a loan to help open an Enchanted Highway Gift Shop, which sells souvenirs on Regent's Main Street.

DAN KOECK (2)

Greff estimates that the sculptures have cost more than $400,000 in all. The money has come from a wide variety of sources, including grants from the National Endowment for the Arts and the Archibald Bush Foundation. Almost all the money goes into the sculptures. Greff says he lives on about $1,500 a year and the free meals he gets from his family. I was skeptical, but as he ran through his budget in the kitchen of his weather-beaten trailer, it turned out, amazingly enough, that he even has a few hundred dollars to spare.

It's easy to dismiss Greff as some Great Plains Don Quixote tilting at junk-metal windmills, except for one thing: people *are* starting to come. More than 10,000 visitors—some from far away—signed the Enchanted Highway Gift Shop's guest book last year.

The day I visited was way past tourist season, but at every single site, somebody pulled up, usually in an RV. "It's so unexpected," said Judy Rodel of Woodville, Wisconsin. "What humans can do with their time and talent is incredible."

Even some Regent skeptics say it's made a difference. "I'm not a big fan," says James Gion, a local attorney. "I think what God gave us out here ought to be enough. But that said, I have to admit it's working." Connie Wax, former manager of the Dacotah Bank branch in Regent, agrees. "We've seen a great deal of new traffic coming through town. It's amazing how many people come because of the highway."

Not that Regent is reborn. Like so many small Great Plains communities, the short, well-worn Main Street features lots of empty storefronts, and the high school closed a couple of years ago. That got even Greff discouraged. "I was really down for a while," he says, "thinking what am I doing this for? Then I thought, as long as your dream is alive, you've got a chance."

Greff imagines a golf course outside Regent, the fairways lined with hundreds of metal trees like the one he made for his trailer's front yard. He also has plans for a Regent motel, where visitors to the Enchanted Highway could spend the night. A few steps away a "Walk of Enchantment" would lead through murals depicting the history of the Great Plains. He's already begun work on the models. And he's recently bought the local elementary school (the city let him have it for $100), which he hopes to turn into an art school (if he can find the funds) that would attract students from all around the country.

Still, he worries about what will happen when he is gone. Even now, *Pheasants on the Prairie* needs painting and there's no telling when he can get to it. But give up? No way. "This is going to be the number one tourist attraction in North Dakota someday," Greff says. "I really believe it can happen." When you listen to him, you believe it too. In the meantime, he's working out the details for his giant spider web.

REED KARAIM *grew up in North Dakota and writes on the West.*

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INTERVIEW

MAY BERENBAUM

ENTOMOLOGIST, URBANA, ILLINOIS

On the role of cellphones, pesticides and alien abductions in the honeybee crisis

BY DAVID ZAX

TIM KLEIN

Honeybee populations in more than 20 states have mysteriously crashed. May Berenbaum, of the University of Illinois at Urbana-Champaign, studies "colony collapse disorder" and its consequences.

THERE WAS A MAJOR DECLINE IN BEE POPULATIONS 20 YEARS AGO. WHY IS THIS MORE TROUBLING? In the '80s the cause was clear: the accidental introduction of a parasitic mite that saps honeybees of vitality. This time, the bees are simply disappearing. There are no dead bodies. It's as if they're not coming home. Among the hypotheses is that their navigation system is perturbed. Honeybees have an incredibly sophisticated system for finding floral nectar and pollen sources, providing directions to their nest mates to promising nectar and pollen sources, recruiting them to these sources, and having everybody come home safely. And that's not what appears to be happening.

WHAT COULD BE CAUSING THIS? Name something and it's been suspected. A British paper [suggested] that cellphone transmission is interfering with bee navigation. There's absolutely no evidence for it. People have also suggested jet contrails, wireless Internet, changes in the earth's magnetic field. More plausibly, high-fructose corn syrup, used to supplement honeybee diets, is not nutritionally very complete and has been shown to influence behavior. Some new pesticides that are known to affect behavior are in wider use, and those may be a factor. People are also suggesting a sort of multiple stress disorder.

IS THIS REALLY A CRISIS? It's a crisis on top of a crisis. [It had previously been projected that] commercial beekeeping [might] cease to exist in the United States by 2035—and that was before colony collapse disorder. And we can't count on wild pollinators because we've so altered the landscape that many are no longer viable.

IT'S NOT JUST ABOUT RUNNING OUT OF HONEY? Honey is trivial compared with the importance of pollination. The two-billion-dollar almond industry in California depends entirely on honeybees. Blueberries, melons, squashes—all kinds of crops rely heavily on honeybees. Over three-quarters of flowering plants—the foundations for most terrestrial food chains—depend on [honeybees and other animal] pollinators. Yet we know pathetically little about most of them.

THIS IS PROBABLY THE WRONG QUESTION, BUT AREN'T BEES A LITTLE SCARY? They're scary in that they have no business being so smart. They're organized and capable of unbelievable feats, such as communicating exact locations to their nest mates by orienting to polarized light and the sun. I can't drive to Decatur without MapQuest, and these bees find their way over much vaster distances. Honeybees air-condition their homes, know when more foragers are needed, know when more nurses are needed.

I'LL OFFER MY THEORY ABOUT THEIR DISAPPEARANCE: HONEYBEES KNOW SOMETHING WE DON'T KNOW AND THEY'RE GETTING OUT. I like the theory that visitors from another planet have decided they were going to abduct the smartest organisms on the planet, and they've picked the honeybees.

For more of the interview with May Berenbaum, go to Smithsonian.com.

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Around the Mall

SCENES AND SIGHTINGS FROM THE SMITHSONIAN MUSEUMS AND BEYOND

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JOHN E. KELLY / FOODPIX / JUPITER IMAGES

HOT STUFF

New study finds chili peppers spiced American food 6,000 years ago

Digging in Venezuela and Peru for evidence of how human beings used plants thousands of years ago, Linda Perry kept finding traces of a distinctive starch—disk-shaped under the microscope, much like a red blood cell—in the crevices of ancient tools. Perry, a postdoctoral fellow

{ CONTINUED ON PAGE 34 }

Biologist at the Helm

Meet Cristián Samper, Acting Secretary

THE SMITHSONIAN INSTITUTION has a new leader, at least for now. Cristián Samper, director of the National Museum of Natural History, was named acting Secretary in March, replacing Lawrence M. Small, who resigned amid criticism over his expenses.

Samper, 41, grew up in Bogotá, Colombia, the son of an American musician mother and a Colombian economist father. Cristián was raised speaking both English and Spanish, and holds dual citizenship. He and his wife, Adriana Casas, an environmental lawyer, have a 17-month-old daughter, Carolina. "I'm learning to be a dad," he says.

As a scientist, Samper, who holds a PhD in biology from Harvard, has specialized in tropical forests, particularly the cloud forests of the Andes. That led him to conservation. "As happens with many biologists," Samper says, "you love what you do and what you study, then you see that there are changes and you start focusing more on why the changes are happening and what you can do about them."

He spent most of the 1990s establishing nature reserves in Colombia and directing that nation's biodiversity research institute. He also helped craft the Millennium Ecosystem Assessment, released in 2005. The United Nations-mandated survey of the world's biodiversity pooled the expertise of 1,360 scientists to make recommendations about how to protect ecosystems.

Samper joined the Smithsonian in 2001 as deputy director of its Tropical Research Institute in Panama. Two years later, he moved to Washington, D.C. to become director of the National Museum of Natural History (NMNH), supervising some 100 researchers. "Cristián has an extraordinary ability to bring people together, even over sticky issues," says Sorena Sorensen, a NMNH curator and research geologist.

Of his time at NMNH, Samper says he's proudest of the Hall of Mammals, which opened in 2003; the Ocean Hall, which opens in 2008; digitizing collections for the Web and his recruitment of new curators. "When I came to the NMNH four years ago, I was one of the youngest people," says Samper. "Now there are many who are younger, and I'm happy about that."

Samper: "An ability to bring people together."

Samper expects to be acting Secretary for up to a year, or as long as it takes for the Smithsonian Regents to name Small's successor. (Samper is himself a candidate.) One of the things he's most looking forward to in his new position is learning more about art, culture and history—which, along with science, are the focus of Smithsonian scholarship and collections. "When you're a scientist you have a curiosity toward understanding things around you," he says. "I think artists are doing something similar, capturing the world through another means. One thing we all have in common across the Smithsonian is curiosity." { BY LAURA HELMUTH }

Smithsonian Institution

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Cristián Samper

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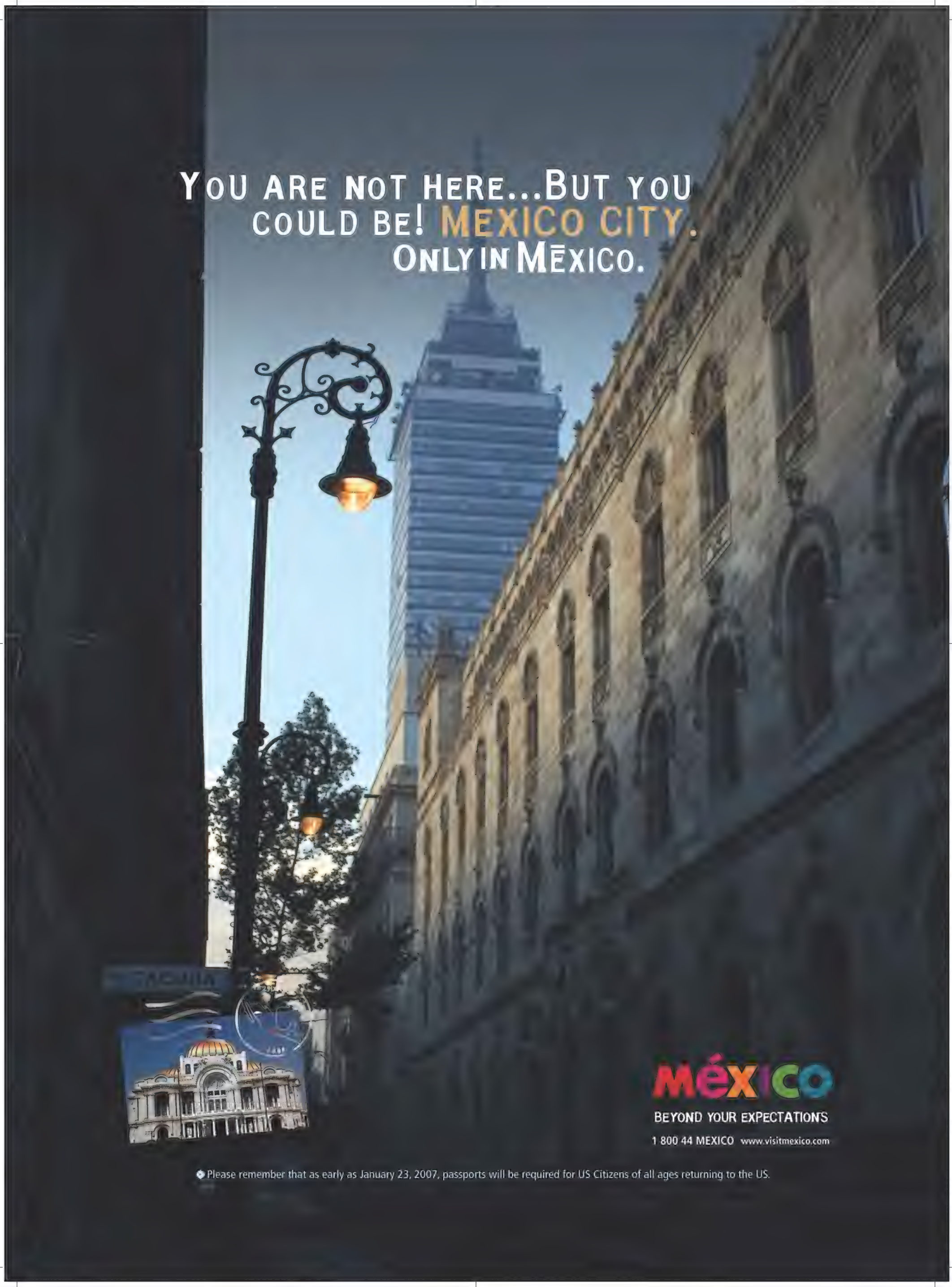

Please remember that as early as January 23, 2007, passports will be required for US Citizens of all ages returning to the US.

How the Ancients Liked it Hot

CONTINUED FROM PAGE 31

at the Smithsonian's National Museum of Natural History, learned that other scientists were stumped by this same mysterious starch residue, which was turning up at archaeological sites all over Central and South America. She called it "the ubiquitous unknown." It was the sort of thing that keeps an archaeobotanist awake at night.

Then she remembered that chili peppers give some people indigestion. That intrigued her, because indigestion is usually caused by starches. So she put a pepper specimen under the microscope and found herself staring at the ubiquitous unknown. Now a study by Perry, Smithsonian scientist Dolores Piperno and 13 other researchers shows that people in the Americas grew chili peppers more than 6,000 years ago—the earliest known domestication of what would become the world's most popular spice.

Traces of starch adhering to ancient tools (inset) led Linda Perry (left) and Dolores Piperno to help solve the mystery of the "ubiquitous unknown."

Archaeologists knew that people in the Middle East were flavoring food with capers, coriander and other spices nearly 10,000 years ago, and that wild peppers had been eaten in Mesoamerica around the same time. The new research, published in the journal *Science*, brought new meaning to old data collected throughout Central and South America. "Sophisticated agriculture and complex cuisines," the researchers write, "arose early throughout the Americas."

Whenever Perry mentions her research to people from different countries—be it Ethiopia, China or Korea—they insist *their* peppers are unique and unequaled. She tells them that, in fact, all peppers originated in the Americas and diffused along trade routes after 1492. Today, chili peppers—that is, all varieties within the *Capsicum* genus, which includes not only hot peppers but also the milder bell peppers—are eaten by one in four people every day, according to *The Cambridge World History of Food*.

It might seem that Perry's and Piperno's research is rather esoteric, but it touches on what it means to be human. Aristotle famously said that Man is a political animal, but it's increasingly clear that Man is also a culinary animal, perhaps the only one that delights in flavoring, garnishing and spicing up its diet. A recent, informal experiment that Perry conducted in her kitchen underscores that point. It resulted in a delectable chipotle salsa. "Smoked jalapeños," Perry says, "are really good."

{ BY DAVID ZAX }

Wishful Thinking

At the Hirshhorn, Yoko Ono invites people to imagine peace

The Smithsonian's Hirshhorn Museum and Sculpture Garden recently welcomed its first work of art by Yoko Ono—a tree. This past April, the artist and widow of John Lennon presented the museum with a white Japanese flowering dogwood, inviting visitors to write wishes on paper tags and tie them to branches like ornaments. The installation is one of several that Ono, right, has planted around the world since the 1990s. She says she has already amassed more than 100,000 wishes and plans to store them all in the "Imagine Peace Tower," a monument planned for Reykjavik, Iceland. Ono suggested that some of the same ideas that motivate artists can help bring about peace, and said people have "a beautiful, incredibly creative power that they're not tapping into for some reason. . . . We just have to open our minds to the power within, and we can do it." Days later, hundreds of wishes (inset) in several languages decked *Wish Tree for Washington, D.C.* Visitors apparently took Ono's advice and wished for things both large and small. Dangling from a branch, one card read, "I wish for world peace and Beatles music on iTunes."

{ BY DAVID ZAX }

CAMERON DAVIDSON, LINDA PERRY; JASON REED / REUTERS (TAG); TIM SLOAN / AFP / GETTY IMAGES

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THE OBJECT AT HAND

Airplane Sculpture

ANACOSTIA COMMUNITY MUSEUM

FLIGHTS OF FANCY

Leslie Payne's flying machines soared, if only in his imagination

BY OWEN EDWARDS

BY THE AUTUMN OF 1918, the war to end all wars was itself coming to an end in Europe. Far away in rural Virginia, Leslie J. Payne, an 11-year-old boy from Northumberland County, went to an air show, gazing in awe as biplanes looped and rolled and performed mock dogfights. Such aerial exhibitions were taking place across America, and kids—some of whom would become aviators themselves—were watching and dreaming the primal dream of flight.

Like thousands of other kids, Payne's imagination was ignited by what he saw, but for him the wonder of airplanes would remain the stuff of dreams. A farm boy whose formal education ended at fourth grade, he would spend his working life not as a pilot but as a handyman and a crabber on the Chesapeake Bay. But Payne had the soul of an artist, and his childhood experience was no less transforming for him than for those who would actually take to the air. In the 1940s, in his spare time, Payne began assembling what he called "imitation" airplanes, crafted of scrap metal, bits of wood and canvas. Today, one of Payne's earthbound flights of fancy, dating from 1970, resides within the collections of the Smithsonian's Anacostia Community Museum in Washington, D.C. (It is currently on loan to the American Visionary Art Museum in Baltimore.)

Payne (at his Virginia farm, piloting one of his creations, 1972) may have never even gotten off the ground in a real airplane.

Though he started small, Payne eventually scaled up his artful assemblages to be large enough to take local kids for rides up and down his family's field, propelled by salvaged aircraft engines that Payne had restored. According to Portia James, a curator at Anacostia, "Payne kept flight logs in which he entered the names of his passengers, and his [imaginary] destination for a flight. He might say to a visitor, 'Today we're going to North Africa.' He always wanted people to visit in their good clothes, probably so that a fantasy flight would seem a special event."

The Anacostia's plane measures 9 feet in length, an inspired product of wishfulness and whimsy that looks deceptively airworthy. The museum's Payne collection also contains his flight suit and aviator's cap, both homemade, various articles from his repair shop and a 6-foot section of Payne's 12-foot-high replica of a control tower, a construction that stood on the "airfield" where he kept his airplanes.

This unique trove of American folk art might have been lost had it not been for a lucky coincidence and the curiosity of an art historian. "Payne's family probably thought of him as an eccentric, not an artist, so his work was neglected," says James. "The hero of this story is Jonathan Green."

CHRIS HARTLOVE, BOB JONES

Q&A

The foremost Piedmont-style blues guitarist, **JOHN CEPHAS**, of Bowling Green, Virginia, will play in this year's Folklife Festival, June 27 to July 1. He spoke with the magazine's David Zax.

WHEN DID YOU FIRST PICK UP A GUITAR? When I was about 9 or 10 years old.

WHO TAUGHT YOU PIEDMONT BLUES? I had a cousin, and he used to show me the Piedmont style, that alternating thumb- and finger-picking. The basic thrust of the technique is trying to play a bass line and then play a melody or lead part at the same time, like on the bass strings you play a bass line and then on the other strings you play a lead or you play the rhythm part. And it's all melded together to happen at the same.

WHY IS IT CALLED PIEDMONT? Because of the Piedmont region, roughly Virginia, parts of Maryland, North Carolina, South Carolina. That's where this particular technique was attributed to, although it had its roots in Africa, where they played instruments like the *kora*, where they would use their thumb and fingers in order to spell out the melody of songs there.

YOU INCLUDE A LOT OF HISTORICAL PIEDMONT BLUES IN YOUR REPERTOIRE. I try to cover that broad spectrum of blues. I wouldn't want to just play contemporary music, when some of the more traditional forms of the music are just as important.

WHAT DO THE BLUES MEAN TO YOU? It's stories of life. It's true-to-life experiences. All you got to do is listen to the lyrics, and you'll see that they are related to some true-to-life experience of somebody—me, you and anybody else that hears it.

Visit Smithsonian.com to hear music by John Cephas.

Gone Fishing

Off the Panama coast, researchers net a slew of new species

It might look like a cartoon character, but the inch-long yellow snail *Tylodina fungina* (below) is one of dozens of little-known or even undocumented species that Smithsonian scientists recently collected off the Pacific coast of Panama. They spent 11 days trawling and diving for jellyfish, crabs, shrimp and other invertebrates in intertidal waters. Research team leader Rachel Collin, a marine biologist with the Smithsonian Tropical Research Institute in Panama City, estimates that the search yielded at least 50 organisms that are completely new to science, including ribbon worms that eat crabs' eggs (above) and sea cucumbers that live under rocks. "It will take years to describe them all," Collin says. "The biodiversity in the tropics is huge, and the number of scientists trained to discover and describe new species is limited." In much of the tropics, she adds, "we haven't even scratched the surface." { BY AMY CRAWFORD }

Green, now director of the California Museum of Photography at the University of California at Riverside, first heard about Payne on a visit to Washington in the mid-1980s. (Though Payne had died in 1981, one of his pieces, as it turned out, had recently been exhibited at Virginia Commonwealth University in Richmond.) "I'm intrigued by the ways art and science are interwoven," Green says, "and this work seemed as if it would be an interesting example." So Green drove to Payne's former farm on the Chesapeake. "The field, and the planes that Leslie kept there, were completely covered by undergrowth," Green says. "I discovered the work, and also caught poison ivy."

Green knew at once that he had stumbled upon something significant. "I was blown away by the intensity of coming upon these things in a natural state," he recalls, "and fascinated by the imagination that created them. When you look at the ingenuity of these remarkable simulations, you see a kind of organizational genius at work."

Green, who was then director of Ohio State University's Wexner Center for the Arts, returned to the site with a crew of six, including a photographer and videographer. He and his team transported several of the deteriorating pieces back to Ohio State, where restoration was completed. (Green would arrange for the Smithsonian's acquisition of Payne's pieces in 1994.) "It's unclear whether Payne ever flew in a real airplane," says Green, "but as an artist he clearly had a flier's love of the experience. Though Leslie's work has a secular underpinning, there is something spiritual about it."

Anacostia's Portia James agrees. "If I put myself in his place—a black man born in 1907 living in segregated rural Virginia—I can easily imagine that for him the idea of flight would have represented a dream of true freedom from the restrictions of his life."

OWEN EDWARDS *is a freelance writer and author of the book* Elegant Solutions.

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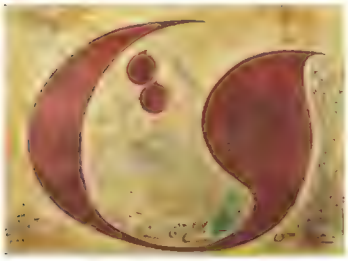
What's Up

SCRIBES Korean calligraphers have long used porcelain water droppers (right, a piscine model) to moisten blocks of solid ink. The Natural History Museum's new Korea Gallery, exhibiting artifacts from the museum's anthropology collections, spells out the details.



CREATIVE WRITING

Libyan-born Ali Omar Ermes riffs on the Arabic letter "*qaf*," or "q," in this 1983 painting, one of 80 works that show how artists play with words and symbols, at the African Art Museum until August 26.

NATIVE FASHION

For members of the Crow tribe, an elk tooth dress is a treasured possession. Traditionally, elk hunters collected eyeteeth, but as the animals became scarce, faux cuspids came into vogue. This 1890 ensemble from Montana, with "teeth" whittled from bone, appears in a collection of 55 Native dresses, at the American Indian Museum through January 2.

CATCH THIS

Food, music and crafts from Asia's Mekong River region (a Thai villager weaves a fish trap) grace the National Mall, plus the traditions of Northern Ireland and Virginia, for the Smithsonian Folklife Festival, June 27-July 1 and July 4-8.

NEW FACES

Among the modern likenesses at the Portrait Gallery through January 6 are several by California-based Brett Cook. He paints graffiti-inspired portraits on plexiglass mirrors (a 2003 spray-paint tribute to labor leader Cesar Chavez), so a viewer's reflection is part of the picture.

{ BY AMY CRAWFORD }

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Getting your feet wet in Belize.

"We were hiking through the rainforest with our guide, Pablo, when the 100 foot tall trees over our heads opened in front of us. We were at a tiny lagoon at the Cave Branch River in Belize, starting a subterranean adventure called cave tubing.

Pablo told us some of the caves we were floating through were up to seven miles deep and a couple hundred thousand years old (Pablo knew his history and explained everything in perfect English). Each cave we passed through was different. My favorite was where the sparkling quartz crystals on the ceiling shimmered like a beautiful chandelier when it was hit by patches of sunlight.

Another cave we went through was like going to a spa. Pablo told us the subterranean mud we found on the walls made a great natural face mask. We couldn't resist the free beauty treatment!

As we came out of the cave system we were greeted by green jungle and bright sunlight bouncing off white limestone cliffs. It was awesomely beautiful, and we were sad this chapter of our great Belize adventure was coming to a close."

— Tiffany Piecewicz —

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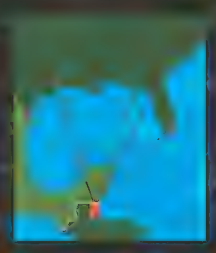

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{ JUNE 2007 · VOLUME 38, NUMBER 3 }

Reconstructing Petra

Two thousand years ago, it was the capital of a powerful trading empire. Now archaeologists are piecing together a more complete picture of Jordan's compelling rock city

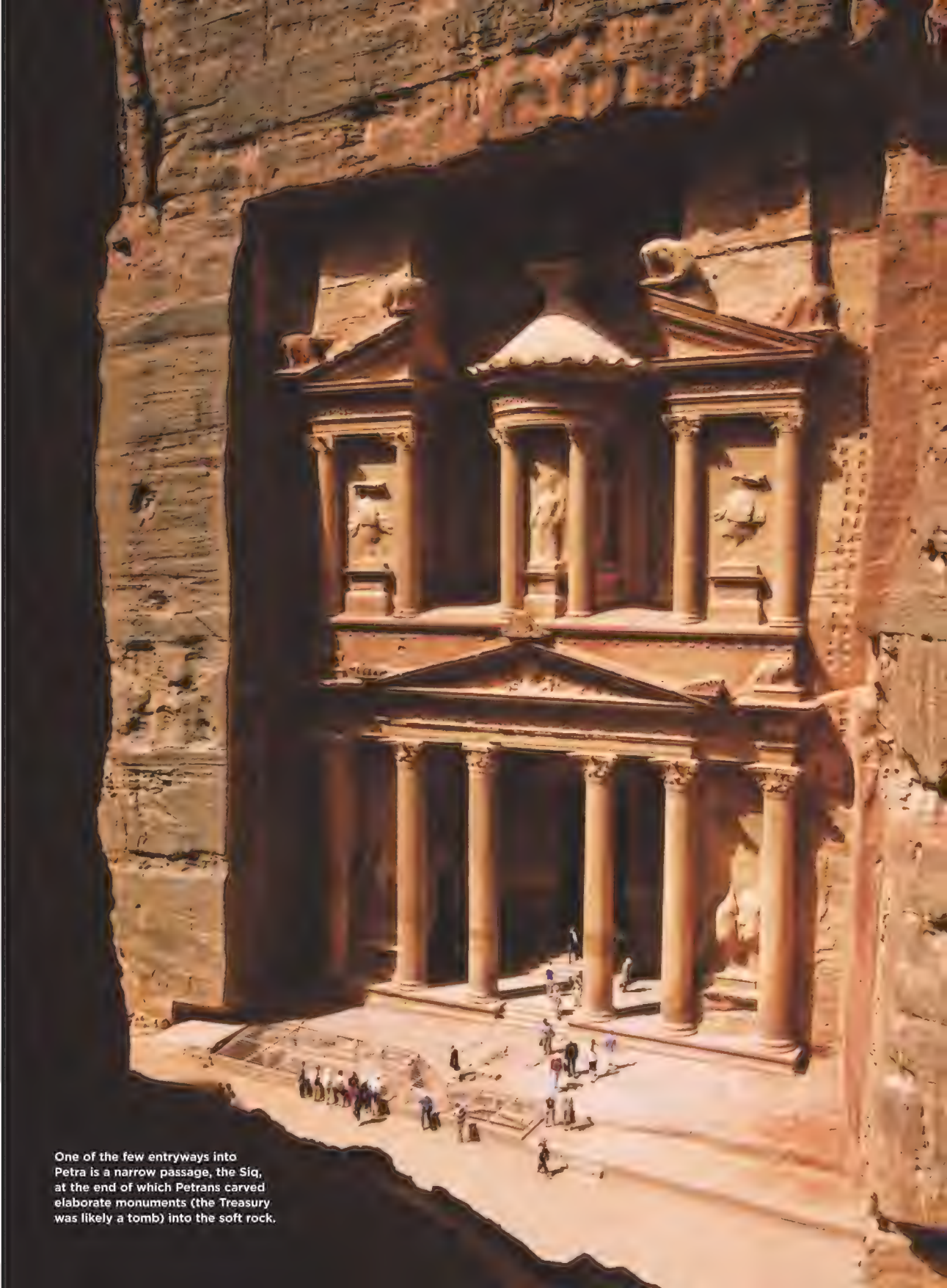
BY ANDREW LAWLER

"Donkey, horse or camel?" The question from my Bedouin guide reminds me of a rental car agent asking, "Economy, full-size or SUV?" I choose economy, and we canter on our donkeys through the steep valleys that surround Petra, in Jordan, as the rock changes from red to ocher to orange and back to red. Two millennia ago our now deserted track was a well-engineered caravan route, bustling with itinerant traders on foot, Roman soldiers on horseback and rich merchants on camels.

Directly ahead is a sheer cliff lined with elegant carvings reminiscent of Greek and Roman temples, a surreal vision in this remote mountain valley surrounded by desert. This is the back door to Petra, whose very name means rock in Greek. In its heyday, which began in the first century B.C. and lasted for about 400 years, Petra was one of the world's wealthiest, most eclectic and most remarkable cities. That was when the Nabatean people carved the most impressive of their monumental structures directly into the soft red stone. The facades were all that remained when 19th-century travelers arrived here and concluded that Petra was an eerie and puzzling city of tombs.

Now, however, archaeologists are discovering that ancient Petra was a sprawling city of lush gardens and pleasant fountains, enormous temples and luxurious Roman-style villas. An ingenious water supply system

P. 43 JEAN ROBERT / LONELY PLANET IMAGES



One of the few entryways into Petra is a narrow passage, the Siq, at the end of which Petrans carved elaborate monuments (the Treasury was likely a tomb) into the soft rock.

allowed Petrans not just to drink and bathe, but to grow wheat, cultivate fruit, make wine and stroll in the shade of tall trees. During the centuries just before and after Christ, Petra was the Middle East's premier emporium, a magnet for caravans traveling the roads from Egypt, Arabia and the Levant. And scholars now know that Petra thrived for nearly 1,000 years, far longer than previously suspected.

Our donkeys slow as we approach Petra's largest free-standing building, the Great Temple. Unlike the hollowed-out caves in the cliffs surrounding the site, this complex stood on solid ground and covered an area more than twice the size of a football field. My guide, Suleiman Mohammad, points to a cloud of dust on one side of the temple, where I find Martha Sharp Joukowsky deep in a pit with a dozen workers. The Brown University archaeologist—known as "Dottora (doctor) Marta" to three generations of Bedouin workers—has spent the past 15 years excavating and partially restoring the Great Temple complex. Constructed during the first century B.C. and the first century A.D., it included a 600-seat theater, a triple colonnade, an enormous paved courtyard and vaulted rooms underneath. Artifacts found at the site—from tiny Nabatean coins to chunks of statues—number in the hundreds of thousands.

As I climb down into the trench, it feels as if I'm entering a battlefield. Amid the heat and the dust, Joukowsky is commanding the excavators like a general, an impression reinforced by her khaki clothes and the gold insignias on the bill of her baseball cap. "*Yalla, yalla!*" she yells happily at the Bedouin workers in dig-Arabic. "Get to work, get to work!" This is Joukowsky's last season—at age 70, she's preparing to retire—and she has no time to waste. They've just stumbled on a bathing area built in the second and third centuries A.D., and the discovery is complicating her plans to wrap up the season's research. A worker hands her a piece of Roman glass and a tiny pottery rosette. She pauses to admire them, sets them aside for cataloging, then continues barking at the diggers as they pass rubber buckets filled with dirt out of the trench. It is nearing midafternoon, the sun is scorching, the dust choking and the workday almost over. "I wanted to finish this two days ago, but I'm still stuck in this mess," Joukowsky says in mock exasperation, pointing to dark piles of cinders from wood and other fuel burned to heat the bath water of Petra's elite. "I'm ending my career in a heap of ash."

Earlier archaeologists considered the Great Temple an unsalvageable pile of stones, but Joukowsky proved otherwise by attacking the project with a vigor she likely inherited from her parents. Her father, a Unitarian minister, and mother, a social worker, left Massachusetts to spend the years before, during and after World War II rescuing and resettling thousands of Jews and anti-Nazi dissidents. When the Gestapo shut down their operation in Prague, the couple barely escaped arrest. While they moved through war-ravaged Europe, their young daughter Martha lived with friends in the United States. Even after the war, her parents remained committed social activists. "They would be in Darfur were they here now," Joukowsky says. "Maybe as a result, I chose to concentrate on the past—I really find more comfort in the past than in the present."

She took up archaeology with gusto, working for three decades at various sites in the Near East and publishing the widely-used *A Complete Manual of Field Archaeology*, among other books. But Petra is her most ambitious project. Beginning in the early 1990s, she assembled a loyal team of Bedouin, students from Brown and donors from around the world and orchestrated the Herculean task of carefully mapping the site, raising fallen columns and walls and preserving the ancient culture's artifacts.

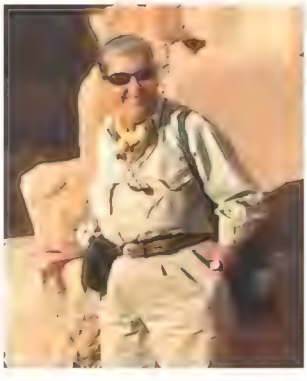
When she began her work, Petra was little more than an exotic tourist destination in a country too poor to finance excavations. Archaeologists had largely ignored the site—on the fringe of the Roman Empire—and only 2 percent of the ancient city had been uncovered. Since then, Joukowsky's team, along with a Swiss team and another American effort, have laid bare what once was the political, religious and social heart of the metropolis, putting to rest forever the idea that this was merely a city of tombs.

NO ONE KNOWS where the Nabateans came from. Around 400 B.C., the Arab tribe swept into the mountainous region nestled between the Sinai and Arabian peninsulas and the Mediterranean Sea. At first, they lived simple nomadic lives, eking out a living with flocks of sheep and goats and perhaps small-scale agriculture. They left little for future archaeologists—not even broken pottery.

The Nabateans developed a writing system—ultimately the basis of written Arabic—though the inscriptions they left in Petra and elsewhere are mostly names

ANDREW LAWLER *wrote about the archaeology of Alexandria in the April issue of* SMITHSONIAN. *He avoids riding camels.*

M KE REAGAN



A monument to Petra's prosperity and its status as the capital of Nabatea, the Great Temple (above) was a pile of rubble until archaeologists (led by Martha Sharp Joukowsky, left) started restoring it.

of people and places and are not particularly revealing of their beliefs, history or daily lives. Scholars have had to use Greek and Roman sources to fill in the picture. Greeks in the decades after Alexander the Great's death in 323 B.C. complained about Nabateans plundering ships and camel caravans. Scholars believe that such raids whetted the Nabateans' appetite for wealth. Eventually, instead of attacking caravans, the raiders began guarding them—for a price. By the second century B.C., Nabateans dominated the incense trade from southern Arabia. Within several decades, they had assembled a mercantile empire stretching for hundreds of miles. The people who a few generations earlier had been nomads were now producing eggshell-thin pottery, among the finest in the ancient world, as well as grand architecture.

By 100 B.C., the tribe had a king, vast wealth and a rapidly expanding capital city. Camels lumbered into Petra with boxes of frankincense and myrrh from Oman, sacks of spices from India and bolts of cloth from Syria. Such wealth would have attracted raiders, but Petra's mountains and high walls protected the traders once they arrived in the city. The Siq, a twisting 1,000-yard-long canyon that in places is just wide enough for two camels to pass, made the eastern part of the city impregnable. Today it serves as Petra's main entryway. It may be the most dramatic entrance to an urban space ever devised. In ancient times, though, the primary entrance into Petra was likely the road by which I came by donkey.

Writing early in the first century A.D., the Greek his-

MARSHALL AGNEW, MARTHA JOUKOWSKY COLLECTION

Prophet on the Mount

The devout pay respects to Aaron

For at least a millennium, it was Jebel Haroun, not Petra, that attracted visitors. A two-hour donkey ride south of Petra, Jebel Haroun is a rugged mountain crowned by a small white dome. The building is a shrine to Aaron, a brother of Moses and the mouthpiece for the stuttering prophet. The Old Testament relates that, at God's command, Aaron was left naked to die of exposure at the top of a mountain for a lack of deference to the Lord. Age-old tradition says this desolate spot—"Jebel Haroun" is Arabic for Mount Aaron—is where he died. Today, Jewish Hasidim, Muslim villagers and Christian tourists make the arduous trek up the steep mountainside out of reverence to Aaron, who, like his brother, is regarded as a prophet by all three religions. At the top, the view to the west is of the shimmering Negev Desert in Israel.

When my guide and I arrive, the shrine is locked and deserted. But soon a lanky man named Nimet Defala arrives with his wife and mother. "This is my 47th birthday," he explains. "My mother lost her previous child, and she vowed that if I lived, we would visit the shrine every year." They had walked from their village, a couple of dozen miles away. "When we come here, we feel our heart. Aaron was close to God." Defala fishes out a key borrowed from a caretaker, opens the small metal door and invites us into the shadowy space. We go inside, light candles and creep down the worn stone stairs to pay our respects to Aaron. Carvings of Christian crosses, Koranic verse and Hebrew prayers are interspersed across the cool stone walls.

Here is the Middle East in all its sacred and profane complexity. The simple building dedicated to a Jewish prophet is a fourth-century Christian sanctuary renovated by a 13th-century Egyptian sultan. On the plateau just below the shrine are the remains of a Byzantine monastery used between the fourth and seventh centuries A.D. (and excavated since the late 1990s by Finnish archaeologists). The prophet Muhammad himself is said to have visited Jebel Haroun as a child. One of the Byzantine monks living there at the time proclaimed that Muhammad was destined to change the world.

Yet the bitter animosities that cleave the region are present too. Christians living here in the 12th century appealed for help to the Crusaders, who built a string of forts in the vicinity. The Muslim conqueror Saladin expelled the invaders, and non-Muslims were not welcome at this holy site until the 1990s. The very morning I make my pilgrimage, in July 2006, the latest war begins, in Israel and Lebanon. The one-month conflict will take 1,000 lives.

My guide and I come out of Aaron's temple blinking in the bright sun, say goodbye to Defala and untether our grazing donkeys. We gallop down the bare mountain, raising dust and whooping like movie cowboys. —*A.L.*

torian Strabo reported that while foreigners in Petra are "frequently engaged in litigation," the locals "had never any dispute among themselves, and lived together in perfect harmony." Dubious as that may sound, we do know that the Nabateans were unusual in the ancient world for their abhorrence of slavery, for the prominent role women played in political life and for an egalitarian approach to governing. Joukowsky suggests that the large theater in the Great Temple that she partially restored may have been used for council meetings accommodating hundreds of citizens.

Strabo, however, scorns the Nabateans as poor soldiers and as "hucksters and merchants" who are "fond of accumulating property" through the trade of gold, silver, incense, brass, iron, saffron, sculpture, paintings and purple garments. And they took their prosperity seriously: he notes that those merchants whose income dropped may have been fined by the government. All that wealth eventually caught the attention of Rome, a major consumer of incense for religious rites and spices for medicinal purposes and food preparation. Rome annexed Nabatea in A.D. 106, apparently without a fight.

In its prime, Petra was one of the most lavish cities in history—more Las Vegas than Athens. Accustomed to tents, the early Nabateans had no significant building traditions, so with their sudden disposable income they drew on styles ranging from Greek to Egyptian to Mesopotamian to Indian—hence the columns at the Great Temple topped with Asian elephant heads. "They borrowed from everybody," says Christopher A. Tuttle, a Brown graduate student working with Joukowsky.

One of Petra's mysteries is why the Nabateans plowed so much of their wealth into carving their remarkable facades and caves, which lasted long after the city's free-standing buildings collapsed from earthquakes and neglect. The soft stone cliffs made it possible to hollow out caves and sculpt elaborate porticoes, which the Nabateans painted, presumably in garish colors. Some caves, Tuttle says, were tombs—more than 800 have been identified—and others were places for family members to gather periodically for a meal memorializing the dead; still others were used for escaping the summer's heat.

At its peak, Petra's population was about 30,000, an astonishing density made possible in the arid climate by clever engineering. Petrans carved channels through solid rock, gathering winter rains into hundreds of vast cisterns for use in the dry summers. Many are still used today by the Bedouin. Tuttle leads me up the hill above the temple and points out one such cistern, a massive hand-hewn affair that could hold a small beach cottage. Channels dug into the rock on either side of the canyon, then covered with stone, sent water hurtling to cisterns near the center of town. "There are abundant springs of water both for domestic purposes and for watering gardens," Strabo wrote circa A.D. 22. Steep hillsides were converted to terraced

PATRICK HORTON / LONELY PLANET IMAGES

According to the latest archaeological discoveries, Petra prospered for about 1,000 years, even after a devastating earthquake. (Christopher Tuttle inspects a Byzantine bath.)

vineyards, and irrigated orchards provided fresh fruits, probably pomegranates, figs and dates.

The pricier real estate was on the hill behind the temple, well above the hubbub of the main thoroughfare and with sweeping views to the north and south. Tuttle points out piles of rubble that once were free-standing houses, shops and neighborhood temples. A Swiss team recently uncovered, near the crest, an impressive Roman-style villa complete with an elaborate bath, an olive press and frescoes in the style of Pompeii. At the base of the hill, adjacent to the Great Temple, Leigh-Ann Bedal, a former student of Joukowsky's now at Pennsylvania State University in Erie, uncovered the remains of a large garden. Complete with pools, shade trees, bridges and a lavish pavilion, the lush space—possibly a public park—is thought to have been unique in the southern part of the Middle East. It resembles the private ornamental gardens built to the north in Judea by Herod the Great, who lived until 4 B.C. Herod's mother, in fact, was Nabatean, and he spent his early years in Petra.

By the fourth century A.D., Petra was entering its decline. Joukowsky takes me on a tour of the newfound spa, which includes marble-lined walls and floors, lead pipes and odd-shaped stalls that might have been toilets, all indications of prosperity. But the growing sea trade to the south had sucked away business, while rival caravan cities to the north such as Palmyra challenged Petra's dominance by land. Then, on May 19, A.D. 363, a massive earthquake and a powerful aftershock rumbled through the area. A Jerusalem bishop noted in a letter that "nearly half" of Petra was destroyed by the seismic shock.

Scholars long assumed the catastrophe marked the end of the city, but archaeologists have found abundant evidence that Petra remained inhabited, and even prospered, for another three centuries or so. Almost 100 years after the earthquake, local Christians built a basilica now famed for its beautiful and intact mosaics of animals—including the camel, which made Petra's wealth possible—just across the main street from the Great Temple. Some 150 scrolls—

SHERRY ROBISON

A church used until the seventh century A.D. and excavated in the 1990s (a Bedouin man cleans a mosaic on the church floor) contained papyrus scrolls that attest to Petra's longevity.

discovered when the church was excavated in 1993—reveal a vibrant community well into the seventh century A.D., after which the church and, apparently, most of the city was finally abandoned.

FORGOTTEN FOR A MILLENNIUM in its desert fastness, Petra reemerged in the 19th century as an exotic destination for Western travelers. The first, Swiss adventurer Johann Ludwig Burckhardt, visited in 1812 when it was still dangerous to be a foreign Christian deep within the Ottoman Empire. Disguised as a Persian pilgrim, he marveled at Petra's wonders but could not linger, since his curiosity aroused the suspicions of his local guides. "Great must have been the opulence of a city which could dedicate such monuments to the memory of its rulers," he wrote. "Future travelers may visit the spot under the protection of an armed force; the inhabitants will become more accustomed to the researches of strangers, and then antiquities . . . will then be found to rank among the most curious remains of ancient art."

Petra has lately fulfilled that prophesy. It is now Jordan's top tourist destination, attracting hundreds of thousands of visitors a year. Hollywood's Indiana Jones sought the Holy Grail in one of Petra's caves in a 1989 film, dramatizing the site for a worldwide audience. The 1994 peace treaty between Jordan and Israel made mass tourism possible. Foreigners began coming to Petra, and devout Jews began making pilgrimages to nearby Jebel Haroun, which, according to tradition, is the site of the prophet Aaron's tomb (see sidebar, p. 46). The nearby village of Wadi Musa has been transformed from a straggling collection of run-down mud-brick houses into a boomtown of hotels (the Cleopetra) and stores (the Indiana Jones Gift Shop). Petra is also a top contender in an international contest to name the New Seven Wonders of the World. Candidates were nominated by a panel of experts, and winners will be chosen by votes. (You can vote online at new7wonders.com.) Winners are scheduled to be announced next month.

ANNIE GRIFFITHS BELT / NATIONAL GEOGRAPHIC IMAGE COLLECTION

The main road in Petra, once spectacularly colonnaded, was traveled by traders from Egypt and Greece. Carts must have been forbidden; there are no wheel prints in the soft stone.

Despite all the publicity and the parade of tourists, much of Petra remains untouched by archaeologists, hidden under thick layers of debris and sand built up over the centuries. No one has found the sites of the busy marketplaces that must have dotted Petra. And although local inscriptions indicate that the Nabateans worshiped a main god, sometimes called Dushara, and a main goddess, the Nabateans' religion otherwise remains mysterious.

So while the work by Joukowsky's team has revealed much about ancient Petra, it will be up to a new generation of researchers like Tuttle to tackle the many rubble piles—and mysteries—that still dot the city's landscape. "We really know next to nothing about the Nabateans," says Tuttle as he surveys the forbidding landscape. "I hope to spend most of my professional life here."

Tuttle and his colleagues will be assisted by Bedouin skilled in uncovering and reassembling the past. Bedouins lived in Nabatean caves for at least a century, until the 1980s when the government pressured most to move to a concrete settlement outside the ancient city to make way for visitors who come to explore the site. My guide, Suleiman Mohammad—who worked at the Great Temple before switching to the more lucrative tourist trade and who married a Swiss tourist—tells me he is grateful to have so many foreign visitors. But not all Bedouin are so lucky, he says. In the harsh country outside Petra, he points to a group far out in the desert: "They have no shoes, wear tattered clothes, and just have goats—there are no tourists out there!"

Suleiman invited the excavation team and me to dinner at his home that night. He greeted us warmly, and we climbed to the roof to enjoy the sunset. The red sun softens the ugly concrete village. Returning downstairs, we sat on cushions and ate from a large platter of traditional *maglouba*, clumping the rice into lumps with our hands and relishing the warm chicken. It was Thursday night, the start of the Arab weekend, and after dinner a young American and a Bedouin arm-wrestled to great laughter and shouting. Outside, the large waning moon rose and, far below, the red rock of Petra turned to silver in the soft desert night.

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raphers from 86 nations. And the winners are . . .

YES, CERTAIN THEMES recur, such as the joys of the open road: lonely undulating two-laners, neon-basked diners and weathered barns, even an ant's-eye view of Death Valley blacktop. And there are cowboys galore, including, in Times Square, a guitar-playing "Naked Cowboy," or so he advertised himself on the back of what little he did happen to wear. All told, amateur photographers in 50 states, the District of Columbia and 85 other nations digitally submitted 8,447 photographs to our 4th Annual Photo Contest. Thank you, one and all. ▪ We solicited entries in five categories—The Natural World, Americana, People, Travel and Altered Images, for photographs that have been manipulated. A selection of finalists and winners follows, and you'll find all 50 finalists on our Web site, Smithsonian.com. In addition, we add one new photograph from the contest every day. ▪ This year's grand-prize winner is a Natural World entry of the Tukituki River Valley in New Zealand. The photographer is 18-year-old Joelle Linhoff, of Minnetonka, Minnesota (see Editor's Note, p. 8). She'll receive a *Smithsonian Journeys* adventure for two at the Albuquerque International Balloon Fiesta in October (or the cash equivalent). Each category winner receives $500. ▪ In September, Smithsonian.com will announce details of our 5th Annual Photo Contest, and we fully expect to see more terrific shots of the open road, of cowboys, of exotic plants, of native peoples in traditional garb. Helen Starkweather, the editor who coordinates the contest—to be capped by an exhibition in July at the Smithsonian Institution Castle on the National Mall—isn't troubled by the recurring themes. Many pictures, she says, draw on archetypes that "remind us of the experiences, emotions and relationships that we all share, no matter who we are and where we live."

GRAND PRIZE WINNER, THE NATURAL WORLD

JOELLE LINHOFF, AGE 18
MINNETONKA, MINNESOTA

PHOTOGRAPHED JULY 2005

Linhoff spent three days vacationing at a camp overlooking New Zealand's Tukituki River Valley, getting up mornings "to follow the rising sun." Most days were foggy, says Linhoff, but usually "there were no horses in the pasture." But on the day she took the winning picture (left), there were many, including a white one featured in *Lord of the Rings*.

WINNER, PEOPLE

EZRA MILLSTEIN, AGE 34
WASHINGTON, D.C.

PHOTOGRAPHED FEBRUARY 2004

Millstein, who has been taking pictures since kindergarten, was on a year-long trip across Asia when he encountered this religious ascetic, or sadhu, begging in the streets of Madurai, India. "His patience and understated grace were in great contrast to the surrounding bustle," says Millstein, a grants officer. "He seemed almost frozen in time."

WINNER, AMERICANA

TREY RATCLIFF, AGE 35
AUSTIN, TEXAS

PHOTOGRAPHED JULY 2006

Ratcliff says he "was on the side of a bridge" for Austin's Fourth of July celebration above the Colorado River. "It was on the edge of a Texas summer storm, so there was driving wind and rain," says Ratcliff, CEO of an online games company. "I happened to catch this one between wiping down my lens and stabilizing the tripod in the wind."

WINNER, THE NATURAL WORLD

TENG WEI, AGE 40
KUALA LUMPUR, MALAYSIA

PHOTOGRAPHED NOVEMBER 2006

When Teng heard that there were "creepy little ants colonized in [a friend's] backyard," he headed to suburban Lukut, outside Kuala Lumpur, Malaysia. While shooting some 100 photographs over the space of about an hour, Teng picked up a branch and dropped a smaller ant into a group of larger ones. "The bigger ants started to stand up," he said. "For what reason, I don't know."

WINNER, TRAVEL

PAUL HILTS, AGE 55
BASALT, COLORADO

PHOTOGRAPHED FEBRUARY 2006

Walking past Wat Chetawan temple in Chiang Mai, Thailand, one day, Hilts, who annually visits Asia with his wife during the winter months, happened upon a monk ordination ceremony open to the public. As incense clouds diffused in the humid interior of the temple, Hilts noticed a monk with a digital camera. The scene, Hilts says, provided an "interesting contrast between modern technology and the ancient ways of traditional Buddhism."

WINNER, ALTERED IMAGES

NICHOLAS EDENS, AGE 28
TOLEDO, OHIO

PHOTOGRAPHED NOVEMBER 2006

On a visit to the Toledo Zoo with his wife and son, Edens noticed the white lion standing on a rock. "For a majestic and strong creature to take on such a soft and humbled expression was amazing to see," says Edens, a network engineer. Later, at his computer, he selectively altered the lighting, color, softness and detail to further express that ethereal moment.

FINALIST, THE NATURAL WORLD

DAMJAN VOGLAR, AGE 31
LJUBLJANA, SLOVENIA

PHOTOGRAPHED JULY 2004

On a photographic expedition to the botanical garden in Ljubljana, Slovenia, Voglar used a macro lens—one of his favorite techniques—to capture this erotic close-up of an agave plant. This image, says Voglar, a graphic designer, is now part of his growing photographic collection of "abstract forms, shapes and structures that we find in nature."

FINALIST, AMERICANA

JACQUELINE COOPER, AGE 59
ASHFIELD, MASSACHUSETTS

PHOTOGRAPHED AUGUST 2005

Staying at a friend's cabin in Winchester, New Hampshire, Cooper set down her fiddle, picked up her camera and captured this young girl singing, accompanied by her mother on dobro. Cooper and friends gather at each other's homes to perform tunes and ballads, mostly Appalachian: "The roots of cultural heritage are preserved, infused with new life and passed on," says Cooper, an artist.

FINALIST, ALTERED IMAGES

SHEA BEEBE, AGE 36
CONVERSE, TEXAS

PHOTOGRAPHED MAY 2006

Beebe took a photograph of her then-8-year-old daughter, Peyton, layered an image of a tree over it and added "gold tint to give it a more dream-like quality." Often, Beebe, who plans to pursue a photojournalism degree this fall, will look at unaltered photos "and try to imagine what they could be if I added an unusual color or layered them with another photo of mine."

FINALIST, TRAVEL

DIANE KROUPA, AGE 68
ST. LOUIS, MISSOURI

PHOTOGRAPHED OCTOBER 2006

To take advantage of the early morning light at Canyonlands National Park in Moab, Utah, Kroupa hiked half a mile in the dark "over an uneven trail with loose gravel and slippery footing. But the reward was well worth it," says Kroupa, a former desktop troubleshooter. "As the sun started to rise, everything the rays touched in the canyon began glowing with an orange hue. There were about a dozen other photographers gathered around the arch taking pictures."

FINALIST, PEOPLE

DAVID MENDELSOHN, AGE 34
BROOKLYN, NEW YORK

PHOTOGRAPHED JUNE 2006

Mendelsohn, an architect, had walked down the stairs from the Manhattan Apple store's "glass cube" vestibule when he looked up and thought, "Ooh, cool!" and shot this photo. "The view through the glass floor, the reflections and texture turn an immediately recognizable subject into something that needs to be studied further to be understood." Mendelsohn adds, "I like the ghostly anonymity."

Visit Smithsonian.com/contest for more images from the grand prize winner.

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CAPTAIN GOR

"Gordon cut the rags off some of the negroes with his knife" as they boarded his ship, according to trial testimony. The loading of 897 slaves took "less time than a sensible man would require for his dinner," the *New York Times* would later report.

DON'S INFAMY

In its first four decades, the United States passed five separate laws barring American ships from the slave trade. The last, enacted in 1820, provided for the death penalty. Like the others, it was roundly ignored—until Abraham Lincoln's administration took over the case against Nathaniel Gordon

BY RON SOODALTER **ILLUSTRATIONS BY STAN FELLOWS**

ABOUT A MONTH after the *Erie* left Havana, four or five members of the ship's crew had occasion to take a good look in the hold. There they saw 150 hogsheads of whiskey; tons of rice, beans and farina; barrels of beef and pork; and 250 bundles of disassembled water casks that had been loaded in Havana—far more than the crew would need for a conventional voyage. A year and a half later, crew members would testify that when they signed up, they had believed the *Erie* "to be bound upon a legitimate voyage," but it was the nature of the cargo that led them to think "that all was not right"—the extra supplies could sustain hundreds of captives. They said they voiced their suspicions to their captain, Nathaniel Gordon—who told them that "they had shipped as sailors, and would do better to return to their duties than to talk to him." A Yankee captain was not a man to entertain a democratic exchange of ideas with his crew; there would be no further confrontations.

As April 1860 gave way to May and then June, the *Erie* sailed east toward the Congo River. Gordon, a Maine native on his fourth slaving voyage, had little reason to fear punishment. The most recent law banning his trade was a 40-year-old toothless relic. The only military power in any position to stop him was a tiny U.S. naval force whose primary mission was to protect American vessels from foreign interference. The courts, North and South, were ruled by judges sympathetic to slavers and abetted by corrupt officials. Presiding over them was President James Buchanan, who had declared he would never hang a slaver.

After throwing anchor on the Congo, Gordon immediately assembled his entire crew and confirmed that they had indeed "shipped up a slaver." He then offered each man a dollar a head for every slave delivered alive to Cuba.

Some accepted readily. One had the temerity to ask for more money. (Gordon refused.) The others had no recourse but to agree. They were in an unforgiving place, and death could come from any number of directions: hostile natives, brigands, starvation, thirst or, most probably, disease. There was no way to know when another ship might come along, and besides, most American ships on the river were slavers. The prospects of a ride home on a legal vessel were slim.

Over the next few weeks, Gordon set about the business of negotiating with a local slave trader and refitting the ship. After making his deal, he had the whiskey off-loaded, along with the 250 packets of shooks and hoops to be assembled into barrels, filled with river water and stowed in the hold. At least one of the crew, William Martin, fell ill with fever and remained aboard the *Erie*; Gordon put him to work making and repairing sails. By August 7, all was ready, and Gordon sailed downriver to pick up his cargo at a makeshift port called Sharks Point.

Gordon's whiskey bought him 897 Africans, some half of whom were children, the youngest 6 months of age. The rest were divided fairly evenly between men and women, the oldest around 40. Like all slaver captains, Gordon could select his cargo. While males brought the most money and children the least, he could accommodate more slaves—and therefore make more money—with a strong complement of children.

The captives were loaded onto launches and rowed to the ship's side. Gordon stood on deck holding a knife, and as they came on, he cut off and threw overboard whatever skimpy rags they were wearing. Taking each by an arm, he shoved the men in one direction, the women in another. The *New York Times* would later report that the loading took "three-quarters of an hour, or less time than a sensible man would require for his dinner."

The next morning, the *Erie* sailed out of the Congo and headed north, bound again for Havana. As day broke, with only a few hours of ocean behind her, Gordon sighted a large steamer in hot pursuit. Telescope in hand, he studied the fast-moving vessel.

Deception was common on the high seas. If the captain of an American slaver suspected that a pursuing vessel was British, he would hoist the American flag—the British had no right to search American vessels. If the warship was American, the slaver would raise a foreign flag, generally Spanish or Portuguese. If still challenged and boarded, he would introduce a foreign national as captain, claim to be a passenger and present to the American officer a complete, though spurious, set of foreign registration papers.

That morning as the steamer drew closer, Gordon concluded that it was a British warship, and he flew the American colors. This would prove a costly mistake.

THE SHIP TURNED OUT to be the USS *Mohican*, a new steam-powered sloop of war recently added to the African Squadron, the woefully inadequate U.S. fleet organized in 1842 under a treaty with Britain to seize slave ships on ocean waters between Africa, the Americas and the Caribbean. The *Mohican* was rigged to move quickly under either steam or sail. She carried six guns and sailed under the command of Sylvanus W. Godon, a battle-seasoned career officer. He had come upon the *Erie* by sheer chance.

Later that day, Godon wrote to Secretary of the Navy Isaac Toucey that his crew fired a gun to stop the *Erie* and, upon boarding, found nearly a thousand slaves belowdecks

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and "a large number of persons on board claiming to be passengers," but no one who would identify himself as captain or mate. He noted that he had found a document that named Gordon as captain, but that Gordon "says he sold the vessel up the Congo, and is now a passenger on board."

Godon selected a small crew from among his men and placed them aboard the *Erie* under the command of Lt. John W. Dunnington and officer Henry Davis Todd. He ordered them to sail to Liberia—a voyage of 1,500 miles—where they were to discharge the Africans to the American agent in Monrovia. During the 15-day voyage, more than 30 of the captives would die, their bodies thrown overboard.

Godon's suspicions prompted him to arrest Gordon and two mates, William Warren and David Hall. Four others from the *Erie* crew, whom Godon believed to be Americans, were taken aboard the *Mohican*; they were eventually transferred to another African Squadron ship, which handed them over to the U.S. marshal in New Hampshire. Godon ordered Dunnington and Todd to proceed to New York City after leaving Liberia and surrender Gordon and his two mates to federal authorities there.

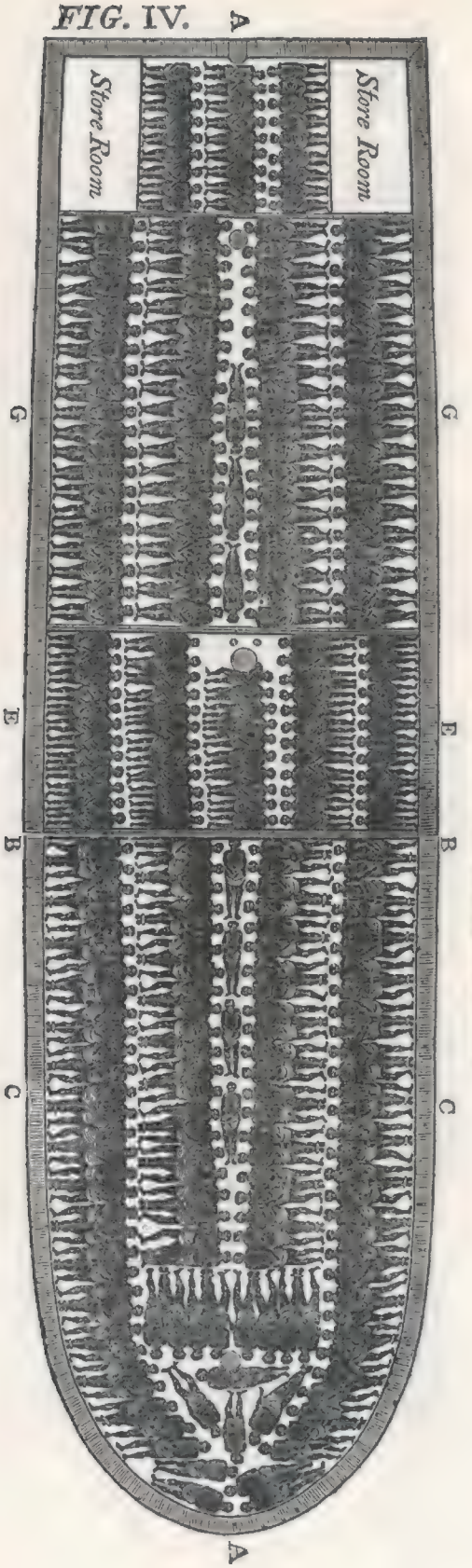
Although New York was the location of the country's most prominent federal court, it made an ironic venue for a slaver. New York had been a slave-trading city almost from its inception as a Dutch settlement in 1624. The West India Company delivered 11 Brazilian natives to tiny New Amsterdam in 1626. New York saw its first slave revolt in 1712, when armed slaves murdered nine whites. Retribution was swift and savage: the gallows claimed 13, while 3 were burned at the stake, one was broken at the wheel, one was starved to death and another was cooked over a slow fire. Twenty-nine years later, New York's slaves again attempted to rebel, but their plot was discovered before they had taken any action. Four whites and 18 slaves were hanged, 13 other slaves were burned at the stake, and an additional 70 were sent in chains to the Caribbean. There were no further uprisings.

By 1800, one out of every five New York families owned slaves. Slave traders were well known to the city's business community; some ranked among the city's most prominent members. More slave-trade expeditions were organized and financed in the city than in any other place in the world.

Upon arriving in New York, Gordon, Warren and Hall were indicted under two laws: an 1800 statute that banned "voluntarily serving on board a vessel engaged in the slave trade," and that so far toothless Piracy Act of 1820, which declared that any U.S. citizen serving on a foreign slave ship, or anyone serving on a U.S. ship that seized a "Negro or mu-

RON SOODALTER *is working on a book about modern-day slavery.* **STAN FELLOWS** *has been an illustrator for 30 years.*

A document found aboard the *Erie* named Gordon as its captain, but he says "he sold the vessel up the Congo, and is now a passenger on board," Navy officers reported.



latto . . . shall be adjudged a pirate; and . . . shall suffer death." The captain was lodged in the Eldridge Street Jail, where he was allowed to roam the building freely, receiving friends and family, and, U.S. Marshal Robert Murray later wrote, was "dined and wined to an almost unlimited extent." After paying $50 sterling per night to his jailer, Gordon was even allowed to go on the town, provided he return the next morning. According to Murray, Gordon regarded himself "not as a felon, but a gentleman temporarily out of his latitude."

Gordon had little reason to be apprehensive. He had engaged one of New York City's top attorneys, Philip J. Joachimsen, to defend him before a court with an impossibly poor record of slaving convictions, and it was known that the district attorney had no stomach for a capital verdict. In the unlikely event of a conviction, the president of the United States stood ready to pardon him.

THEN, ON NOVEMBER 6, 1860, Abraham Lincoln was elected president of the United States. Six weeks later, the South Carolina legislature declared the dissolution of union between that state and the federal government. Two weeks after that, New York City mayor Fernando Wood recommended to his common council that the city secede from the Union, "make common cause with the South" and refuse to allow passage of Union troops through the city. Better this, Wood reasoned, than jeopardize business relations between New York and the South. The council members, whose chicanery had earned them the epithet "The Forty Thieves," approved the plan.

Slaves were "packed close" on the *Erie* (as on the *Wildfire*, 1860, above, and the *Brookes*, 1791, left), and "their sufferings were agonizing," sailors said.

In the meantime, the four *Erie* sailors who had been taken to New Hampshire were tried and acquitted of the charge of piracy. Though they were convicted of voluntarily serving aboard a slaver, each man was fined a dollar and would spend less than a year in jail. Gordon's attorney undoubtedly passed these encouraging results along to him.

However, as the broom of a new administration swept the incumbent U.S. marshal out of office, things began to change. The new marshal, Robert Murray, a balding, impressive-looking man of strong character, was described by a contemporary as resembling "an admiral on his quarterdeck," with a reputation as a "detective of fair and excellent repute." Soon after assuming his new role, in April 1861, he had Gordon and his two mates placed in the New York City

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Hall of Justice. Built to resemble the common council's conception of an Egyptian temple, the forbidding structure had earned the nickname "the Tombs." Warden Charles Sutton wrote that Gordon and his mates "became greatly alarmed at their position" once "they found that the new administration was disposed to view the case in all its enormity." Gordon's trial date was set for June 18, 1861.

And despite the city's proclaimed sympathy with South Carolina, "when Sumter was fired on [in April 1861] the whole current changed like magic," Theodore Roosevelt recalled in his 1910 history of the city. "The bulk of the Democrats joined with the Republicans to show by word and act their fervent and patriotic devotion to the Union. Huge mass-meetings were held, and regiment after regiment was organized and sent to the front. Shifty Fernando Wood, true to his nature, went with the stream, and was loudest in proclaiming his horror of rebellion." The Forty Thieves rescinded their approval of his secession plan.

The Lincoln administration appointed a new U.S. district attorney for the Southern District of New York: E. Delafield Smith, 35, a protégé of Secretary of State William H. Seward. Horace Greeley's *New York Tribune* had written that Smith is "one of the youngest members of his profession, and has not achieved its highest distinctions; but he has talents and a spotless reputation." He also had ambition, and he picked his battles carefully. While he said that he held "no views which any conservative citizen might not entertain" on slavery per se, he also considered trading in slaves "against humanity, unjust and impolitic." The Gordon case was Smith's opportunity to make an impact on both the slave trade and his own reputation, and he intended to take full advantage of it.

When court convened on June 18, Smith elected to drop the lesser charge of serving on board a slave ship and to prosecute on the piracy indictment alone—that Gordon had forcibly detained the Africans. The prosecutor concluded his opening statement by calling for the death penalty "as an example to deter" others. The defense argued that Gordon was foreign-born, not involved in the enterprise at all and merely seeking passage home.

ALTHOUGH PROVING that Gordon was an American citizen and that the *Erie* was American-owned was essential to the prosecution, Smith focused his argument on evidence that the ship was under Gordon's command when *Mohican* officers discovered the captives. His key witness was officer Henry Davis Todd, who testified that Gordon had demonstrated how to "pack" the slaves after feeding them—"by spreading the limbs of the creatures apart and sitting them so close together that even a foot [of a passing sailor] could not be put upon the deck." Presiding judge William Davis Shipman, who as U.S. attorney in Connecticut 11 years earlier had prosecuted an accused slaver and lost the case, all but lit the jury's path to a conviction. He undermined the claim that Gordon was just a passenger, dismissed the argument that Gordon was foreign-born, brought into serious question the likelihood that a sale of the *Erie* had taken place and rendered preposterous the idea that the ship could have been on the Congo River for any purpose other than acquiring slaves.

The jurors were out for 20 hours, and came into court the following morning hopelessly deadlocked at seven to five for conviction. Shipman had no choice but to call a mistrial.

"It is a remarkable fact that the slave-traders in this city have matured their arrangements so thoroughly that they almost invariably manage to elude the meshes of the law," thundered the *Tribune*. "Now they bribe a jury, another time their counsel or agents spirit away a vital witness. . . . The Government is determined to break up the African slave-trade, and it will accomplish it. To effect this it will be necessary to purge the Courts and offices of these pimps of piracy."

Were members of the jury bribed, as the *Tribune*

Gordon first stayed in a New York City jail, where he could receive friends and leave for nights on the town. But that changed after the new U.S. marshal, Robert Murray (left), clapped him in "the Tombs" (below).

COURTESY OF BARBARA ARDREY NEW YORK PUBLIC LIBRARY

implied? There is no way to know for sure. The court, however, had made a crucial mistake: whenever a recess or an adjournment was called, it had let the jurors go their separate ways. It was easy for Gordon's supporters to approach jurors. The court would not make that mistake again.

WHEN GORDON'S second trial commenced, in November, Murray not only kept the jurors sequestered, he kept them in his or his deputies' sight, even to go to lunch. On day two of the trial, Smith called his new star witness, William Martin, the sailor who had fallen ill on the Congo.

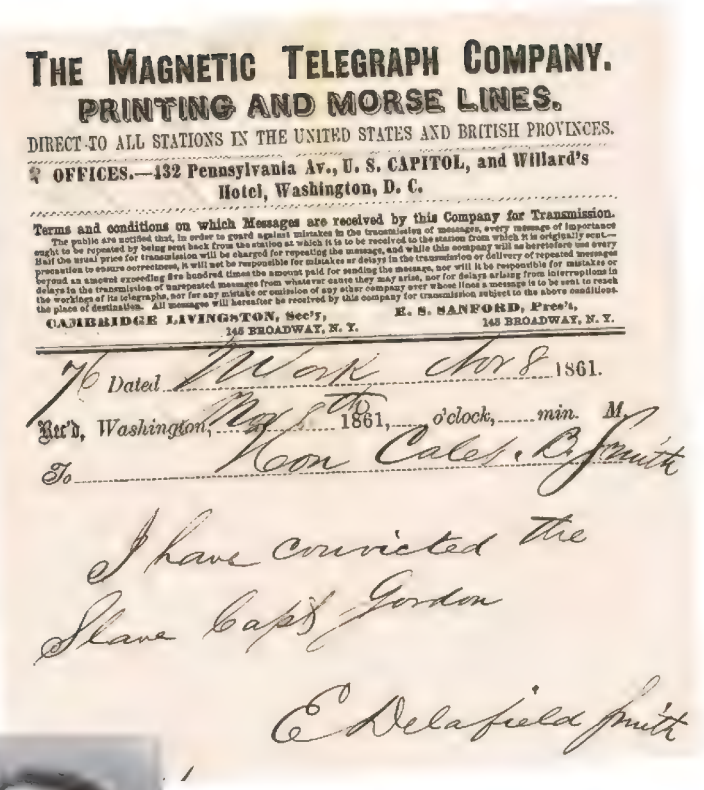
When the ship anchored 45 miles upriver, Martin testified, Gordon was "on and off the vessel all the time," doing business with the slave trader, and he had seen Gordon cutting ragged clothing off the captives as they were loaded. Then Martin made the statement that Smith was looking for: "There was no change in the authority of the vessel after the negroes were taken on board." Martin testified that he was at the wheel that night, and that "Captain Gordon . . . and no one else . . . gave him directions as to the course to steer."

Two days later, the jurors retired to consider the evidence. This time, they returned in less than half an hour with their unanimous verdict: *guilty.*

Delafield Smith lost no time in sending a telegram to Interior Secretary Caleb B. Smith. "I have convicted the Slave Capt. Gordon," he crowed. Several days later in a letter to the secretary, he wrote: "The effect in this community has never been paralleled by any criminal conviction in either the state or U.S. courts. Persons crowded into my office, the following morning, and asked if it was really so."

At sentencing on November 30, Judge Shipman imposed the maximum: death. The next day the *New York Times* clamored for the slaver's execution: "Capt. Gordon is as responsible for the death of those on the *Erie*, as if he had taken the life of each by his own hand. For once, when no doubt exists as to guilt, a terrible example should be made."

The *New York Post* proclaimed that what was needed to end the slave trade was "a precedent for administering faithfully the punishment provided by act of Congress for the crime." Added the *Post*'s editor in chief, William Cullen Bryant: "We hope the President's good nature will not overcome his duty as guardian of the laws."



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Dated New York Nov 8 1861.
Rec'd, Washington, Nov 8 1861, 10 o'clock, min. M.
To Hon Caleb B. Smith
I have convicted the Slave Capt Gordon
E Delafield Smith

The new U.S. attorney, E. Delafield Smith (left), saw in the Gordon case a chance to make his reputation. After the verdict, he lost no time in telegraphing news of his triumph to an official in Washington (above).

Lincoln had earned a reputation for the liberal use of the power to pardon. He was, to some, a man of compassion and mercy; to others, a sentimental meddler who was continually undermining military discipline and the sanctity of the courts. Edmund Stedman, Lincoln's pardon clerk, wrote, "My chief, Attorney General [Edward] Bates, soon discovered that my most important duty was to keep all but the most deserving cases from coming before the kind Mr. Lincoln at all; since there was nothing harder for him to do than to put aside a prisoner's application and he could not resist it when it was urged by a pleading wife and a weeping child."

Petitions containing thousands of names found their way to Lincoln's desk, pleading for clemency for Gordon. Two arrived from Portland, Maine, Gordon's home city, listing some 18,000 names. The president also received communications from men of high regard seeking mercy for Gordon, including a plea from Edward P. Cowles, a former justice of the U.S. Supreme Court.

Those who advocated hanging Gordon pressured Lincoln as well. Senator Charles Sumner of Massachusetts visited the White House on February 1, 1862, and later wrote to a friend that he had told the president "that though I am

NATIONAL ARCHIVES (MICROFORM PUBLICATION M160); LIBRARY OF CONGRESS

against capital punishment, I am yet for hanging that slave-trader condemned in New York."

Lincoln had long been clear about his personal feelings toward slavery. "I've always hated slavery, I think as much as any Abolitionist," he said in Chicago in 1858 during his losing bid for the U.S. Senate. But he reiterated time and time again during the run-up to the 1860 presidential election that "we must not disturb slavery in the states where it exists." As for the expansion of slavery, "We must, by a national policy, prevent the spread of slavery into the new territories," adding that "we must prevent the revival of the African slave trade."

There was nothing in Gordon's personal history, with the exception of his wife and young son, to call forth the compassion for which Lincoln was known. Sparing Gordon would do nothing to further the Union cause; on the contrary, while there were thousands of young men dying in the field, it would be highly inappropriate to grant clemency to a man whose crimes had contributed, in a small but undeniable way, to the war that was claiming so many lives.

Now, Lincoln could show Congress, the military, the nation and the world that the new government had the commitment to take an old, dusty, but potentially powerful law and allow it to work in the manner intended by its authors. It was his "duty to refuse" clemency to the slaver, Lincoln said. Nathaniel Gordon would hang.

But the captain would not go quietly.

AT 3 A.M. on February 21, 1862, the day of his scheduled execution, Gordon awoke with a start, looked at his watch, muttered something to himself and lay down facing the wall. Shortly thereafter, deputies noticed that he appeared to be sleeping very fitfully. When they entered his cell, they saw that he was in convulsions—"his features horribly contorted, his eyes bloodshot, fixed, and almost protruding from their sockets, and his extremities cold and stiff. He was awake, but sensible to nothing but pain," Murray, the marshal, recalled in his memoir. The deputies found a small paper packet under the blanket. Gordon had taken strychnine.

The officers immediately raised the alarm. By the time doctors arrived, Gordon's convulsions had become increasingly violent. He went rigid, his pulse nearly undetectable. The doctors pumped his stomach, catheterized him and ordered that he be dosed with brandy and whiskey. Gordon's jaws had locked shut; the doctors had to pry them open with a medical instrument to pour the alcohol down his throat.

For four hours Gordon went in and out of consciousness, suffering horrific cramps in his stomach and limbs. For a time, the doctors felt certain they would lose him, but eventually "his eyes opened and shut; his features, though haggard, resumed a more natural expression; and the numbness and cramps . . . totally subsided," Murray wrote. By 10 a.m. Gordon was able to look at the people surrounding his bed. In the mistaken belief that he was dying, he cried, "I've cheated you! I've cheated you!"

Prison officials had Gordon on his feet by 12:20 p.m. and escorted him to the prison yard. When the captain took his place beneath the rope, he spoke in a soft, friendly tone to Bill Isaacs, the executioner. "I'm an old salt. This sort of death is hard lines," he said. "Make the knot run easy and fix it on the right side."

Word of Gordon's execution spread rapidly. Articles appeared in newspapers from Portland, Maine, to Richmond, Virginia, capital of the Confederacy. The *Richmond Examiner* reported without editorializing. In New York City, the *Christian Intelligencer* saw the execution as a way of cleansing the city's reputation: "Let those who were associated with [Gordon] beware. Their turn may come next."

In the end, however, Gordon was the only one. His mates Warren and Hall eventually were allowed to plead guilty to the lesser charge and were sentenced to two years in prison. By late 1862, it had become increasingly apparent that the Civil War was as much about slavery as it was about union. The slave trade was dying. The country was making a sharp turn into a new era in which trafficking in humans would no longer find acceptance.

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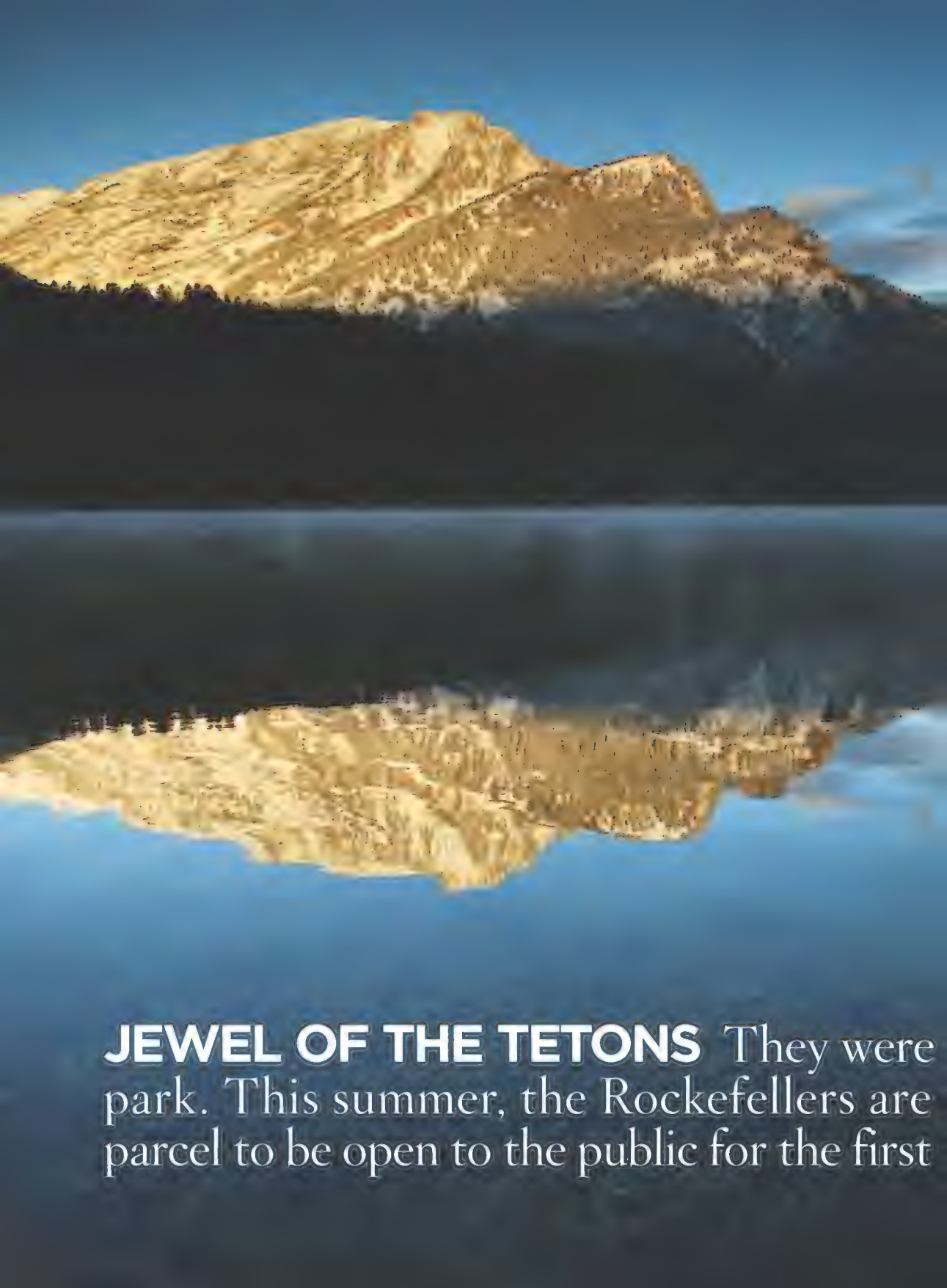
Despite his eleventh-hour attempt to cheat the hangman, Captain Gordon died on the gallows in the Tombs courtyard in 1862. He was the only person in United States history to be executed for trafficking in slaves.



JEWEL OF THE TETONS They were
park. This summer, the Rockefellers are
parcel to be open to the public for the first

the prime movers behind the great Wyoming donating a final 1,106 acres, a spectacular time in 75 years **BY TONY PERROTTET**

Who doesn't love the tart taste of forbidden fruit? Hiking through a pine forest high in Wyoming's Teton Mountains, I felt as if I'd been issued a pass to a secret world. This particular slice of the West, a scenic parcel of lakeside wilderness known as the JY Ranch, has been off-limits since 1932, when philanthropist John D. Rockefeller Jr. claimed it as a summer retreat. Few people have ever seen beyond its entrance, a discreet gate on the gravel Moose-Wilson Road, or the wooden buck-and-pole fences that mark its boundaries. But this September the property will be open to the public—as a new Rockefeller donation to the Grand Teton National Park. Clay James, the longtime Rockefeller family associate overseeing the transfer, was giving me a tour.

Even by the breathtaking standards of Jackson Hole—a 55-mile-long, high-mountain valley dominated by the 13,770-foot Grand Teton—the JY is extraordinary. "There are seven different natural environments on the ranch, from open meadows to lakefront to woodland," James was saying as we walked. "It's rich with huckleberries and hawthorns. You can see moose, eagles, coyotes, black bears. There are wolves in the area. . . ."

Laurance and Mary Rockefeller honeymooned at the JY (below).

It was a classic summer morning, the Wyoming air crisp and clear, the sky an almost electric blue. We arrived at an overlook just above the water, and the trees suddenly parted to reveal jewel-like Phelps Lake framed by Mount Albright Peak. "This is where the main lodge once stood," James said, indicating a spot at our feet where purple wildflowers now burst between bare rocks. "The Rockefeller guests would gather here before dinner to enjoy the view." I followed James down to the lake: along its shallow shore, crystal water rippled over pebbles as smooth and pale as eggs; an osprey cruised high overhead.

The donation of the JY Ranch marks a kind of coda to the family's involvement in Jackson Hole, which began when John D. Jr., son of the founder of Standard Oil, first visited here in 1926. The next year, he started secretly acquiring land in the area with the eventual aim of giving the entire valley to the government, which would protect its dramatic scenery and wildlife within the national park system. He purchased the JY, a working dude ranch, in 1932 for $90,000. Over the years, various members of the Rockefeller family fell in love with the rustic retreat; John D.'s son Laurance S. Rockefeller honeymooned here in 1934, as did another son, David, in 1941. As a result, the JY Ranch was the only parcel John D. held onto when, in 1949, he gave more than 33,000 acres to the government, which established the park as we know it today. Just over 50 years later, in 2001, Laurance, then 91, announced he would give the JY to the park. This final gift will include a state-of-the-art, 6,500-square-foot visitors center crafted from recycled Douglas fir and pine, as well as a spectacular four-mile loop trail to Phelps Lake.

What visitors won't see are the JY's 30 log buildings, many of which dated to its pre-Rockefeller days as a dude ranch—the first in Jackson Hole—from 1908 to 1932. The buildings, along with seven miles of asphalt roads, were removed in 2005 and 2006; twelve were given to the park service and the remaining 18 set aside for a new Rockefeller family ranch outside the park. "The log cabins were not ostentatious," says Jackson Hole historian Robert Righter, and "they just fit into the landscape so awfully well." It was to this idyllic retreat that the Rockefeller family repaired every summer to canoe, hunt, hike, swim and fish—activities not so very different from those pursued by the Shoshone, Crow, Blackfoot and other Native American tribes that were among the first to camp in Jackson Hole during the warmer months.

But today, a visit offers more than a glimpse into a patrician family's private playground. It was here that some of the key discussions were held in the protracted battle over Jackson Hole in the 1930s and '40s—"one of the great conservation success stories of American history," says Joan Anzelmo, the park's former chief of public affairs. Few of the nearly four million people who visit the park each year, or the many more who know the Teton Mountains from Hollywood movies such as *Shane* and *The Big Sky*, or from Ansel Adams photographs, are aware of the epic valley struggles involving a larger-than-life cast of characters, cowboy standoffs, heated passions and wild accusations.

You could call it a classic western.

John D. Rockefeller Jr. (with wife, Abby, in 1931) made Jackson Hole his summer home, and declared the Tetons the "most spectacular mountains I have ever seen." The park service quickly recruited Rockefeller into its conservation efforts.

Jackson Hole has been shaped by isolation. Despite its relative proximity to Yellowstone, which Congress proclaimed a national park with little controversy in 1872, Jackson Hole remained a remote and little-known destination to most Americans until the boom in auto tourism in the 1920s.

For most of the early 19th century, most white visitors to this lush valley thick with wildlife were fur trappers, who used the Tetons as a landmark. These anonymous wanderers coined the term "hole" to describe the unusual high plateau surrounded by mountains. Famously, a group of lovelorn French-speaking trappers dubbed the dominant peaks *les trois tétons* (the three breasts), now called the South, Middle and Grand Teton. When one of the first official surveying groups, under the authority of scientist-explorer Ferdinand V. Hayden, arrived in 1872, they found the Gallic comparison baffling. Up close, the peaks' shapes "become harsh and rugged and angular," wrote member Nathaniel Langford in *Scribner's Magazine*, and looked more like "shark's teeth" than features of the female anatomy.

Only after William Henry Jackson released photographs he'd taken on the expedition did the area begin attracting attention, if largely among the intrepid. One mountaineer, the outdoor-loving aristocrat William Baillie-Grohman, arrived on horseback in September 1880 on his third tour of the West and found himself the only tourist in the valley. He camped for ten days, dining on trout and beaver tails and drinking in the "sublime scenery" that he believed outstripped even that of the Swiss Alps. "The whole picture," he wrote in his travelogue *Camps in the Rockies*, had "the air of a splendid, trimly-kept old park." The first settlers—a trickle of cattle ranchers and farmers—arrived to scratch a living from the land soon after, barely surviving the brutal winters. In the early 1900s, some of the ranchers began inviting wealthy Easterners to the valley. Travelers had to take a long train journey to St. Anthony, Idaho, then transfer to a horse-drawn wagon for a bone-jarring, 104-mile journey that took them over 8,500-foot Teton Pass. Once arrived, they found few creature comforts. In 1911, Owen Wister, author of the classic western novel *The Virginian*, stayed at the JY Ranch for the summer with his family. His daughter later recalled that they dined on elk, salted bear meat ("like dark brown leather"),

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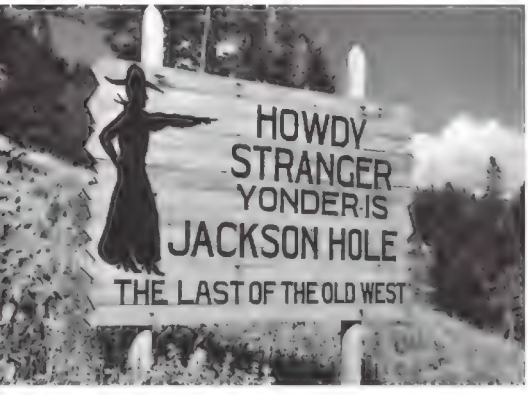
TONY PERROTTET *is the author of* Pagan Holiday *and* The Naked Olympics: The True Story of the Ancient Games.

NATIONAL PARK SERVICE, P. 68 ROCKEFELLER ARCHIVE CENTER (2), PP. 66-67 AARON HUEY

canned tomatoes and breakfast flapjacks with dead flies between the layers.

It was into this rugged Shangri-La that the reserved, square-jawed, 52-year-old heir arrived in the summer of 1926 with his wife, Abby, and their three youngest sons. They had just toured Yellowstone with Horace Albright, that park's visionary 36-year-old superintendent. Sitting down for a boxed lunch some 25 miles north of Phelps Lake, Rockefeller was thunderstruck by the jagged, snowcapped Tetons looming above the emerald-green marshes around Jackson Lake. The peaks, he later wrote, were "quite the grandest and most spectacular mountains I have ever seen . . . they present a picture of ever-changing beauty which is to me beyond compare."

But as the group, led by Albright, continued south into the valley, they were dismayed by the first clumsy incursions



Alarmed at the commercialism (an early billboard, left, and a cowboy bar) that greeted him when he first toured Jackson Hole in 1926, John D. Rockefeller Jr. began secretly buying up valley land for future preservation. His tactics brought him many enemies.

of modern development. Telephone lines marred the view from the road. Around Jenny Lake, perhaps the most picturesque and accessible part of the range, touristy Elbo Ranch—"the home of the Hollywood cowboy"—had set up a rodeo grandstand, complete with concession stands, a parking lot, cafés, a gas station and cabins for the first "tin can tourists" (automobile travelers). Nearby were a honky-tonk dance hall and even, Abby Rockefeller was particularly appalled to note, a bootleg whiskey joint. It was the beginning of the kind of devastation that many Easterners had already witnessed in places like Niagara Falls.

Later in the trip, Albright confided to Rockefeller that three years earlier, in 1923, he had met with six local residents, including a dude rancher, a businessman and a newspaperman, in settler Maud Noble's cabin near Moose Junction, about 12 miles north of Jackson. The residents could already see that Jackson Hole's future lay with tourism, not cattle, and that a conservation strategy was essential. Maybe they could convince a rich Easterner to buy the ranches of the valley and turn them over to the government. That way Jackson Hole could survive as a natural history "museum on the hoof," in the words of one member, author Struthers Burt.

The idea of protecting the Tetons germinated in 1882, when Union general Philip Sheridan toured Yellowstone and the surrounding area; concerned that settlement was threatening wildlife, he proposed extending Yellowstone's borders to Jackson Lake, north of Jackson Hole. The proposal languished, but 15 years later, in 1897, Col. S.B.M. Young, Yellowstone's acting superintendent, revived it in a more ambitious form. He believed that the only way to protect the park's migrating elk herd was to include all of Jackson Hole, where the animals wintered, under his jurisdiction. For the next two decades, the possibility of protecting the valley was regularly raised—Charles D. Walcott, director of the U.S. Geological Survey, suggested in 1898 that Jackson Hole could form a separate "Teton National Park"—but the idea found little support in Congress.

The prospect was greeted no more warmly in Jackson Hole. The fiercely independent ranchers who had moved there felt that any government interference would lead only to the valley becoming overcivilized. (In 1919, at a public meeting in Jackson, residents shouted down even Albright when he proposed an expanded road system in the valley.) Most felt that a national park would reduce their personal freedoms, limit cattle-grazing rights and sap Teton County's tax base. However, as the 1920s progressed, many grudgingly accepted that the remote mountain areas and glacial lakes, useless for grazing or farming, could be protected. In 1929, a rump Grand Teton National Park was created—"a stingy, skimpy, niggardly park," as one historian called it.

But there was no agreement, grudging or otherwise, about the valley floor, including the land next to the lakes, the Snake River and the sagebrush flats, which was already dotted with cattle ranches and landholdings. Albright and his allies feared they could be purchased by unscrupulous developers and turned into a Western version of Coney Island.

Unless, of course, someone else purchased them first.

Jackson residents first learned that somebody was buy-

JACKSON HOLE HISTORICAL SOCIETY (2)

Many local residents feared that the creation of a national park would threaten their livelihoods. In 1943, ranchers armed with rifles (above) protested against the newly established Jackson Hole National Monument, a precursor to the park (below).

ing up property in the valley in 1927. Although some ranchers were near bankrupt and eager to sell, they were also concerned that someone might try to gain control of Jackson Hole by stealth. Finally, in April 1930, the Snake River Company, as the purchasing entity was called, released a statement acknowledging that one of America's richest men was buying valley land and that he intended to donate it to the National Park Service.

Though Rockefeller's secrecy had made good business sense—he had sought to avoid sending land prices skyrocketing—word of his involvement set off shock waves. The news evoked a recurring Western nightmare: an Eastern millionaire in cahoots with the federal government to muscle out the "little man." And as historian Robert Righter notes, the secrecy established a "foundation of mistrust" in future dealings between Jackson residents and the Rockefellers.

Wild stories about the Snake River Land Company's tactics began to circulate—of poor ranchers coerced, of mortgages foreclosed early, of homes being torched by Snake River thugs. Opposition hardened. Jackson Hole residents even founded a newspaper, *The Grand Teton*, whose aim was to denigrate "the Rockefeller crowd" and the park service. Relying on gossip—much of it malicious—the paper attacked, as traitors, locals who supported the park, impugned Albright's honesty and denounced Rockefeller. Wyoming senator Robert D. Carey took the sensational accusations to Congress which, in 1933, dispatched a U.S. Senate Subcommittee on Public Lands and Surveys to Wyoming to investigate. A small army of reporters followed, eager to cover a scandal in this feisty Western town. But after four days of hearings,

ASSOCIATED PRESS, CORBIS

Ghosts in the Sagebrush

Tumbledown structures recall dude ranching's heyday

No signposts point the way to the Bar BC Ranch in the Grand Teton National Park. Visitors must find a rutted, sagebrush-shrouded dirt accessway near the Cottonwood Creek turnout of the main Teton Park Road. A bone-rattling ten-minute drive leads to a locked gate atop a hill. Sprawling by the Snake River below, the Bar BC looks perfectly preserved, with several log cabins and a horse corral nestled in the shade of cottonwood trees. But go closer and most of its structures seem about to collapse. A look through the buildings' dusty, shattered windows reveals old stone fireplaces, antique wallpaper, porcelain bathtubs and broken floorboards thick with marmot scat. Purple wildflowers poke through the timbers of what appears to be a dance floor.

Back in the 1920s, dude ranching's heyday, the Bar BC lay at the crossroads of the Jackson Hole social whirl. It was run by Princeton-educated author Struthers Burt and physician Horace Carncross—both early supporters of the national park. Here, Burt and his wife, western novelist Katharine Newlin Burt, held gatherings for local residents and their guests, which included Eastern writers, artists, poets and socialites, and Hollywood filmmakers. Each summer, for about $300 a month, the Burts and Carncross would host some 50 dudes in the ranches' 45 cabins, and these tenderfoots, along with the wranglers and ranch hands who worked there, created a thriving seasonal village within the valley.

Today, the Bar BC is but one of 318 historic structures scattered across the valley floor. (The Bar BC operated as summer cabins until the late-1980s, when it was taken over by the park service.) Purists want to see all man-made objects removed from the park, but others argue that the rough-hewed "vernacular architecture" should be preserved.

Best known from photographs is the picturesque Mormon Row on Antelope Flats, structures built by Mormon settlers who crossed Teton Pass in 1893. One of them, the very photogenic Moulton Barn, has appeared on innumerable calendar and guidebook covers. Constructed in 1913, its weathered peaked roof echoes the jagged, snowcapped mountains behind it; where the corral once stood, the park's resurgent buffalo herd now grazes. Less known but equally spectacular is the Lucas-Fabian Ranch, which lies off an unmarked road at the foot of the Grand Teton. It was also built in 1913, by Geraldine Lucas, a New York City schoolteacher who took up homesteading as she approached age 50. She was so passionate about her new life that she had her ashes interred on the property. While the ranches' cabins are in good condition, they remain boarded up; several plans have been fielded for the site's use, including one to turn it into an artists-in-residence center, although as yet nothing has come of them. Meanwhile, at the southern end of the park, the White Grass Ranch, built in 1913 as well, is now a facility for teaching people how to restore classic Western structures.

Perhaps the greatest preservation success story is the Murie Ranch, just south of the Moose Visitor Center on the Snake River. When husband-and-wife environmentalists Olaus and Mardy Murie moved here in 1946, this then-primitive outpost became the unlikely nerve center of some of America's most important conservation campaigns. Here, the Muries orchestrated the creation, in 1960, of the Alaska National Wildlife Range and hosted the key meetings that led to the Wilderness Act of 1964. After her husband's death in 1963, Mardy stayed active as "the mother of the conservation movement," helping to add 54 million acres of Alaskan land to the Wilderness Preservation System, among other landmark victories. Before her death at age 101 in 2003, she lived to see the 15-cabin ranch restored to carry on her and her husband's work. It was designated a National Historic Landmark in 2006.

Today, it hosts retreats and conferences on environmental issues, while the Muries' own cabin remains open, filled with photographs, books, a piano—even the Muries' snowshoes. Murie Center director Brooke Williams hopes that more of the park's deserted ranches can be saved. "These log cabins are as close to nature as a man-made structure can get," he said. "Jackson Hole is one of the places where the modern American conservation movement really began. So where better to discuss how to save our world in the 21st century?" —*T.P.*

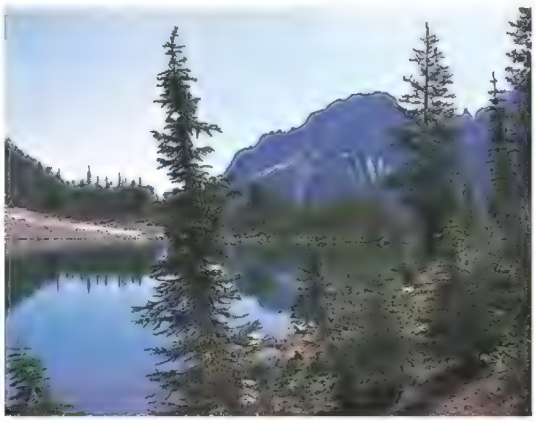
The Bar BC (right) was one of Jackson Hole's earliest and most popular dude ranches (a costume party, above). Said proprietor Struthers Burt, "We have entertained millionaires and poets and . . . spoiled little bobbed-haired flappers."

JACKSON HOLE HISTORICAL SOCIETY; AARON HUEY

it was clear that the allegations were largely untrue; in only one case had national park officials exerted undue pressure. For his part, Rockefeller took the long view of the project. A year earlier he had told the Jackson Hole *Courier* that "his thanks must come from posterity when wildlife and primitive areas will be less abundant."

His stoicism would be sorely tested. For the next 17 years, the park extension would be mired in a mind-boggling array of proposals, counterproposals, histrionic debates and legal challenges. When President Franklin D. Roosevelt ordered that much of the valley be made a national monument in 1943, a group of Jackson ranchers, rifles slung conspicuously across their saddles, staged a protest, driving a herd of cattle across the land. Hollywood actor Wallace Beery led the posse.

After World War II, an invasion of newly affluent tourists demonstrated just how profitable a national park could be, and both sides agreed to concessions. Rockefeller deeded 33,562 acres to the government and, on September 14, 1950, the enlarged Grand Teton National Park was signed into law.



"You can still come up here in the middle of summer and there'll be just two people, you and me," says a longtime visitor to Holly Lake (above) in Grand Teton National Park.

Today, those concessions have led to some anomalies. Grand Teton is America's only national park, for example, with a commercial jet airport and a working dude ranch (the Triangle X). Elk hunting is still permitted (park officials admit that some culling is necessary), and cattle ranchers still enjoy grazing rights, which leads to an occasional sighting of park rangers helping herds across roads. A number of parcels of private land survive—including Dornan's in Moose, a resort on the Snake River, which today has one of the most spectacular bars in the United States. And there are 318 historic structures scattered across the valley. (See sidebar, opposite.)

The Rockefellers' 3,300-acre JY Ranch was one of the parcels left in private hands. According to Righter, John D. might have happily donated it in 1949 to create the park, except that his son Laurance, who shared his father's passion for the outdoors, was so fond of it. Laurance began donating pieces of the JY in the 1980s; the 1,106 acres to be handed over this September make up the final piece of the jigsaw.

One hope for the new acreage, Rockefeller overseer Clay James told me, is that it will lure visitors out of their SUVs and into the wilderness. Since so much of the park can be seen from roadside lookouts, not everyone ventures into it. Admittedly, the mountain scenery can be a little intimidating: the Teton range rises so precipitously from the valley that it looks impenetrable to all but trained climbers. But all you have to do is hike down any of the trail heads—along the shady String Lakes, for example, where shallow, crystalline waters create a stunning, if frigid, sand-floored swimming pool—to enter a landscape untouched since the days of the fur trappers.

One morning I made a more ambitious hike, into the high-altitude Paintbrush Canyon. As I climbed the trail above the tree line, sunlight ricocheted off the canyon's multicolored rock walls. After about three hours, I reached Holly Lake, a near-frozen tarn surrounded by moss and gnarled shrubs. Here, I ran into the only soul I'd seen—an elderly New Englander who told me he'd visited the park each year since 1948. He lamented how global warming had made the glaciers recede and all but disappear. "But the experience hasn't changed," he told me. "You can still come up here in the middle of summer and there'll be just two people, you and me." Gazing across the valley below—a landscape unmarred by motels, gas stations, souvenir stores or strip malls—I recalled the words of William Baillie-Grohman, that lone camper of 1880. He had found the Grand Teton "the boldest-shaped mountain I am acquainted with," and Jackson Hole "the most striking landscape the eye of a painter ever dreamt of."

It turns out that John D. was right—now that "primitive areas" are less abundant, it's hard to believe there ever was a time when national park employees may have been afraid to wear their uniforms in town. The parade of travelers heading to the Tetons every summer has brought great prosperity to Jackson, where cowboys, bikers, white-water rafting instructors and Hollywood stars rub shoulders in former gambling palaces like the Silver Dollar Bar. Clifford Hansen, a Wyoming senator who rode in the armed protest against the park in 1943, has admitted publicly that the expanded park has been a godsend for the state, and even the news that the Rockefellers have purchased a new ranch outside the park, opposite Teton Village, has been greeted warmly. "We're all now thankful that the Rockefellers are keeping up their association with the park," says Righter. "Philanthropy on that scale is hard to find these days."

TONY PERROTTET

"Part of the challenge of folding is to capture the feeling I get when I look at real animals," says Lang (holding his *Praying Mantis, opus 416* and shouldering *Mt. Diablo Tarantula, opus 481* and *Shizuoka Cicada, opus 445*). Opposite: his 5-inch *Tree Frog, opus 280*.

Into the Fold

Physicist Robert Lang has taken the ancient art of origami to new dimensions

BY BETH JENSEN

Among the multilegged creatures in Robert Lang's airy studio in Alamo, California, are a shimmering-blue long-horned beetle, a slinky, dun-colored centipede, a praying mantis with front legs held aloft, a plump cicada, a scorpion and a black horsefly.

So realistic that some people threaten to stomp on them, these paper models, virtually unfoldable 20 years ago, represent a new frontier in origami. No longer limited to traditional birds and boats, origami—the art of paper folding—is evolving artistically and technologically, thanks to a small but growing number of mathematicians and scientists around the world, including Lang. What's more, this group believes the ancient art holds elegant solutions to problems in fields as diverse as automobile safety, space science, architecture, robotics, manufacturing and medicine.

A laser physicist and former researcher with NASA's Jet Propulsion Laboratory, Lang, 46, is a pioneer in technical and computational origami, which focuses on the mathematics behind the art. "He's the Renaissance man of origami," says Jan Polish of Origami USA, which has 1,700 members worldwide. "A lot of people who come from the science end are mostly interested in origami as a problem to be solved. His work is very intriguing because he has combined art and math. His signature is a high degree of reality with a breath of life."

Lang has created or breathed life into more than 495 intricate new origami models, some requiring hundreds of folds: turtles with patterned shells, raptors with textured feathers, a rattlesnake with 1,000 scales and a tick the size of a popcorn kernel. His masterpiece, first created in 1987, is a life-size, 15-inch-tall Black Forest cuckoo clock (p. 76), complete with pendulum, pine cones and stag's head. It is so complex that Lang was asked to demonstrate its folding on Japanese television—a task that took five hours. Most of these works adhere to one deceptively simple requirement—the use of a single sheet of paper with no cuts or tears.

Lang, who has authored or co-authored eight books on origami, has exhibited pieces in art galleries and at origami conventions in Paris, New York, Tokyo, Boston, Seattle and San Diego. In 2004, he spent a week as artist-in-residence at the Massachusetts Institute of Technology (MIT), where his lectures drew standing-room-only audiences of paper folders and math and computer-science students. This past September, he organized the Fourth International Conference on Origami in Science, Mathematics and Education, held at the California Institute of Technology.

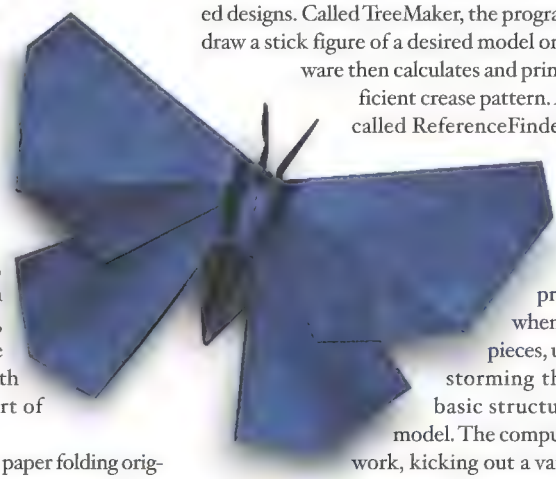
"One of the things that's really unusual about him is his intuition for paper and his technical acuity at folding it," says Erik Demaine, an associate professor in electrical engineering and computer science at MIT who studies all types of folding and is a frequent collaborator with Lang. "When he works on a problem, he usually can see the solution, get out a piece of paper and demonstrate it."

Lang first embarked on his paper route at the age of 6, when his father, Jim, a sales and service manager for an equipment company in Atlanta, and his mother, Carolyn, a homemaker, gave their precocious son a book on origami. "I remember the moment I started," Lang recalls. "This seemed like such a wonderful thing, that you could take some paper, something free, and make really neat toys out of it. There's essentially an endless supply of raw material."

By the age of 10, Lang had folded flapping birds and jumping frogs, and was running out of published mod-

ROBERT J. LANG· P. 74 MARK R. CHARDS

Lang first folded his *Black Forest Cuckoo Clock, opus 182* in 1987 from a single 1.26- by 10.26-foot piece of paper. "For a time this was the most complex origami figure around," he says. *Butterfly, opus 410* is at right.



els. "I started wanting to make things that weren't in the books, and at some point began making my own designs," he says. He continued folding, and by the time he graduated from the California Institute of Technology—with a doctorate in applied physics—the art of origami was in a resurgence.

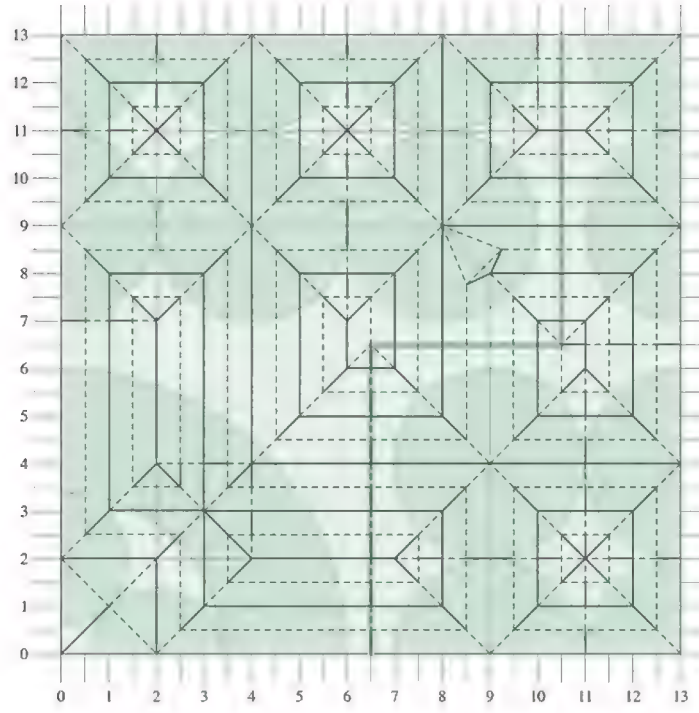
No one knows for sure when or where paper folding originated, but it seems to have been well established by the 1600s in Japan, where messages of good luck and prosperity have long been folded into ceremonial pieces. There was also an independent tradition of paper folding in Europe. But until the mid-20th century, practitioners had been limited to only a few hundred classic and oft-repeated designs. Then, in the 1950s, new techniques and designs created by Japanese origami artist Akira Yoshizawa started being published and exhibited. Soon after, experts began working on the mathematics that would allow the design and computation of abstract geometric shapes in folded paper. Lang and others use analytical geometry, linear algebra, calculus and graph theory to solve origami problems.

In the early '90s, Lang and Japanese origami master Toshiyuki Meguro simultaneously hit on a technique that has revolutionized folding. Now called "circle-river packing," the technique allowed origamists to do something that had always eluded them—create models with realistic appendages in specific spots. Each of a design's "flaps"—an area of the paper that is to become a leg or an antenna, for instance—is represented by a circle or a strip. Circles are drawn, or "packed," onto a square piece of paper, like oranges in a crate, with no overlap. The spaces between the circles may contain strips, or rivers, hence the name, circle-river packing. For the first time, designs that existed only in the mind's eye could be reliably reproduced without endless—and sometimes fruitless—trial and error.

Now origami designers like Lang could churn out models of startling realism, including insects, whose many legs, wings and antennae had always thwarted designers. The 1990s became the golden age of insects—known to insiders as the Bug Wars. "Someone would create an insect, then someone else would make one with wings, then someone else would have wings with spots," Lang recalls. "I worked a lot on insects, and in working out those design techniques, I developed techniques that could be used for many subjects."

During the 1990s Lang also developed a computer program that uses circle-river packing to produce sophisticated designs. Called TreeMaker, the program allows artists to draw a stick figure of a desired model on-screen. The software then calculates and prints out the most efficient crease pattern. A second program, called ReferenceFinder, determines the sequence of folds needed to create the model. Lang says he uses the programs only rarely when designing his own pieces, usually when brainstorming the design for the basic structure of a particular model. The computer does the grunt work, kicking out a variety of crease options. Then it's back to pencil and paper and hands-on folding to add the many design subtleties that don't yet exist in algorithmic form.

ROBERT J. LANG (2)



Lang's Crab Recipe

The key to Lang's extraordinary pieces? A unique blend of advanced mathematics and plain old artistry. His 4-inch *Fiddler Crab, opus 446* (below) began as a crease pattern (left) that he created on a 16-inch-square sheet of paper; the green shapes delineate the minimum paper needed to form the crab's body, eight legs, large claw, small claw and eyes. For instance, the quarter doughnut at lower left, running from about 3 1/2 to 6 on the grid, represents the large claw, and the two half circles inside it stand for the claw's split end. The lines mark where to make creases, with dashed lines indicating valley, or concave, folds, and solid lines indicating mountain, or convex, folds. Next comes Lang's own particular brand of artistry. Following his diagram fold by fold he creates what's called the origami base—a crisply folded geometric form that looks nothing like a crab but has a flap of paper in the right place for each body part. He next painstakingly shapes those flaps into lifelike parts. "It looks very mysterious," says Lang, "if you don't know the background. The secret to creativity," he continues, quoting a remark attributed to Albert Einstein, "is knowing how to hide your sources."

"I'm not trying to make a photograph, I'm trying to capture the essence, the impression of something," Lang says. "Some subjects I come back to over and over—cicadas, simple birds. I can do them in a different way and get ever closer to my mind's-eye image of what they ought to look like. You wouldn't think that origami could be reduced to equations, but some parts of it can. But the artistic aspect will never be captured in equations."

As it happens, the science and art of complex folding holds the potential of solving problems in sheet-metal, collapsible structures such as solar panels for space applications, and robotic arm manipulation. In medicine, research is under way to develop new blood-vessel stents that can fold up for insertion into weakened arteries, then expand once in place.

At carhs gmbh, formerly EASi Engineering GmbH in Germany, engineers trying to simulate air-bag deployment first had to model the flattening of the bag into its folded form—something their software couldn't manage. A computer algorithm developed by Lang allowed engineers to fold various shapes for simulation. Lang has also consulted with engineers at California's Lawrence Livermore National Laboratory on a new generation space-based telescope dubbed Eyeglass. The goal is to put huge telescopes—up to 328 feet in diameter—into orbit for purposes that include the viewing of planets outside our solar system. Getting such a behemoth into space poses a problem because the hold of the space shuttle measures a slim 15 feet in diameter. Lang devised a folding pattern for a 16-foot-diameter prototype that can be folded for transport, then unfurled like a flower coming into bloom once in space.

Lang is also busy writing a second book on mathematical folding techniques, and designing and folding a gigantic paper pteranodon, whose 16-foot wingspan will grace Redpath Museum in Quebec. "Origami as an art form is radiating in all directions from its beginnings as a traditional craft," he says. "We're still nowhere near the limits of what's possible."

BETH JENSEN *is a freelance writer based in Pleasanton, California. Despite her interest in origami, she has yet to successfully fold a road map, much less a fiddler crab.*

ROBERT J. LANG (2)

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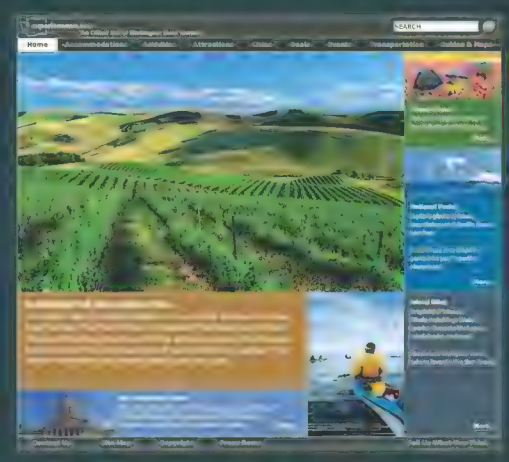

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Scripture Alfresco

In northeastern Romania, 450-year-old paintings on the exterior of monasteries and churches—now open again for worship—tell vivid tales of saints and prophets, heaven and hell

BY ANDREW CURRY

FROM THE TIME Romania's Stephen the Great took power in 1457 until his death in 1504, he fought 36 battles against the mighty Ottoman Empire, winning all but two. And the warrior king was as religious as he was ferocious. He built churches after many victories, filling the tiny enclave of Bukovina—part of the ancient principality of Moldavia—with Orthodox sanctuaries and monasteries. He was made a saint in 1992, and last year, a Romanian national television survey named him the greatest Romanian in history.

But it was Stephen's illegitimate son Petru Rares who turned his father's church building into something extraordinary. Beginning around 1530, Petru Rares, who ruled from 1527-1538 and again from 1541-1546, promoted a new vision for Bukovina's churches. He commissioned artists to cover the interiors and exteriors of a number of structures with elaborate frescoes (portraits of saints and prophets, scenes from the life of Jesus, images of angels and demons, heaven and hell) and encouraged his nobles to decorate their local churches in the same manner. The spectacular results are still in evidence today, nestled in the wooded valleys of northeastern Romania. The best preserved are part of rural monasteries in the towns of Sucevita, Moldovita, Voronet, Humor, Suceava, Patrauti and Probota. Another, a small church, is in the village of Arbore. Seven of the churches were placed on Unesco's World Heritage list in 1993, and the Romanian government is pressing to have the eighth, Sucevita, one of the last to be built, added soon.

Petru Rares and his spiritual advisers hoped to bring the lessons of the Bible to priests and illiterate peasants alike. "This was a way to communicate without words," says Moldovita nun Sister Tatiana. Peasants flocking to Sunday services from their mountain villages would have seen only high stone walls, built to defend against invading armies. The real treasures were hidden behind those walls: mod-

The Sucevita Monastery (left) was built in the last decades of the 16th century in the Moldavian style, a blend of Byzantine and Gothic art and architecture. The exterior walls' striking frescoes (right, "The Ladder of Virtues," contrasting the order of heaven with the chaos of hell) still retain their brilliant hues.

DAGL ORTI / ART ARCHIVE; P. 81 BOGDAN CRISTEL / REUTERS

The Moldovita Monastery (above) was built by Petru Rares in 1532. The predominantly yellow-and-blue frescoed paintings on its exterior (right, the apses' "Prayer of All Saints," a recurring theme in Christian Orthodox art) were done in 1537.

est, three-room Gothic churches, covered from bottom to steeple-top with Byzantine iconography in vivid, intense colors. Voronet, built by Stephen the Great in 1488, is a deep blue; Sucevita, erected nearly a century later, is a grassy green; Moldovita's frescoes are filled with yellow accents, and Humor, built by Petru Rares in 1530 and covered in frescoes five years later at his direction, is primarily red.

Creating the frescoes took a sure, quick hand. Teams of four or five painters would first even out the church's rough stone walls with a thick layer of mortar, then smooth on a thin, fine-grained layer of lime plaster mixed with natural fibers such as finely chopped straw. Once the last layer was applied, the artists had only a few hours to work before the plaster dried. "They had to be very organized, like an assembly line today," says Oliviu Boldura, an art conservation professor at the National University of Arts in Bucharest.

Apprentice painters would apply background color and decorations, while faces and hands were reserved for master painters. Artists had to be chemists as well, mixing pigments from rare clays, semiprecious stones and common minerals. Azurite and malachite created vivid blues and greens. Ochre from clay was heated to produce reds, yellows and browns. As the plaster dried, it reacted with the mineral pigments, fixing the colors. The technique, which involved no organic materials, unlike frescoes that use egg whites as a binder, made the colors unusually durable. "Don't forget, even today exterior paints don't stay one year outside before changing color," Boldura says. "These have lasted for 450."

The Bukovina painters, most of whose names have been lost, also added local touches. In Voronet's magnificently

Berlin-based **ANDREW CURRY** *is a former editor at* SMITHSONIAN.

The *pronaos*, or entrance, of the Humor Monastery, which dates from 1530, is embellished with frescoed, Byzantine-style traditional Orthodox images from the Synaxarion, or liturgical calendar. Petru Rares and his wife are buried in the church.

preserved "Last Judgment," souls on their way to heaven wear locally embroidered cloth; angels announcing the last judgment blow shepherd's horns; and King David plays a Romanian *cobza*, or lute. "The painters weren't famous. They were folk painters," says artist and historian Eugen Mircea. "They were trying to make sure simple people could relate to the Bible stories in the pictures."

For sheer gore, some of the depictions of saints and martyrs rival Hollywood horror movies. Calm, beatific figures are shown being burned alive, dragged behind horses, thrown over castle walls, strangled, boiled and beheaded. Their tormentors are usually dressed as Turks.

Stephen the Great's victories against Turkey's Ottomans were, in fact, short-lived: Moldavia eventually became an Ottoman vassal in the mid-16th century, paying tribute in exchange for local autonomy and religious freedom. By the early 1600s, the principality was in decline—perhaps, Mircea suggests, because of too much spending on churches and frescoes. In 1775, the area became part of the Austrian Empire, and to suppress local impulses toward independence, the Austrians closed most of the monasteries. The rest fell into decline. The Communist era after World War II ended a century and a half of neglect. The brutal dictator Nicolae Ceausescu, who took power in 1965 and ruled until he was overthrown in a bloody revolution in 1989 (and, with his wife, executed), made the churches into national museums open to tourists, but not to religious orders.

By then, time had taken a toll; only a handful of the churches had significant frescoes left intact. Weather remains the main culprit. Mountain temperatures can range from 90 degrees Fahrenheit to -5 degrees in a single year, expanding and contracting the frescoes and creating tiny cracks that let in water. North-facing frescoes, exposed to the harshest winds and rain, are badly faded at best. Conservation work, which began in earnest 30 years ago, is ongoing.

Although Bukovina is one of the poorest corners of one of Europe's poorest countries, things are changing. Romania joined the European Union this past January, and Western-style resort hotels are springing up to serve the growing tourist trade. Since the fall of Communism, the churches have undergone a renaissance of sorts. Today most are thriving abbeys, home to large communities of Orthodox nuns who make a living farming and producing handicrafts. The nuns still find time to pray seven hours a day, drawing inspiration from the ancient visions on the walls. Adjusting her black shawl against the morning chill, Sister Tatiana regards her Moldovita sanctuary with special pride. "Each church has its own personality, its own history, its own meaning," she says. "But this church is my heart. There are so many symbols—the paintings have theology, philosophy, history. Every year I find something new."

JON ARNOLD IMAGES / AGE FOTOSTOCK. P. 82 (TOP) MEHLIG MANFRED / SIME / GIGIA MARCH-ORI PHOTO AGENCY. P. 82-83 AGE FOTOSTOCK

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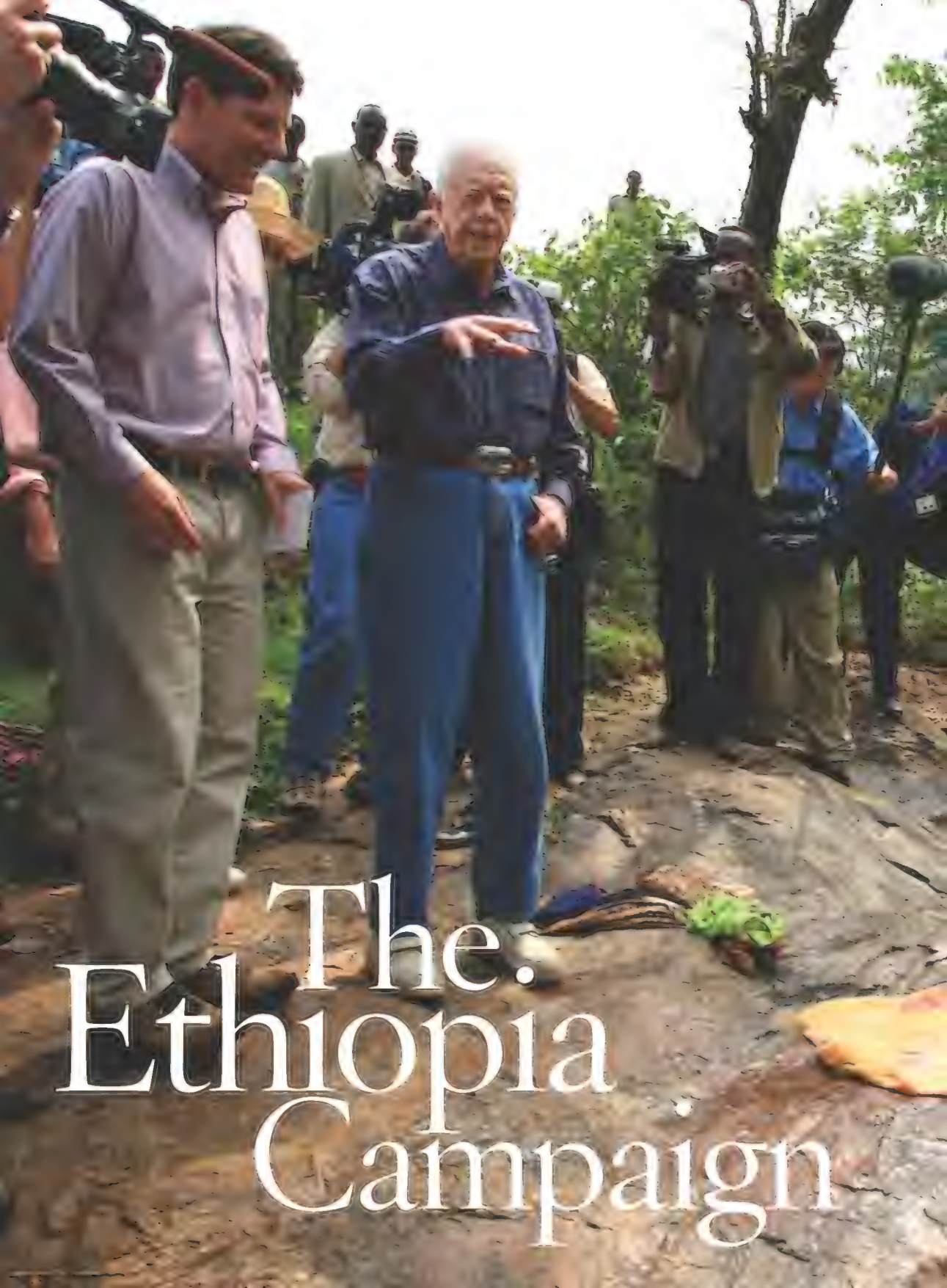

The Ethiopia Campaign

After fighting neglected diseases in Africa for a quarter century, former president Jimmy Carter takes on one of the continent's biggest killers—malaria

BY ROBERT M. POOLE

PHOTOGRAPHS BY ANTONIO FIORENTE

His once-sandy hair had gone all white; his shoulders were a bit more stooped; his freckled face was lined with new creases. But Jimmy Carter's 82 years had diminished neither his trademark smile, which could still disarm skeptics at 20 paces, nor his enthusiasm for the long chance, which had propelled this obscure peanut farmer to national prominence in the first place. That quixotic spirit took him this past February to an impoverished corner of Ethiopia, where he would announce his most audacious crusade yet: to eliminate malaria, an elusive and ever-changing killer, from this ancient African nation of 75 million people.

Now rare in developed countries, the disease kills more than a million victims each year in the world's poorest regions. At least

Trailed by reporters, Jimmy Carter launched his antimalaria initiative in the small community of Afeta. Some 50 million Ethiopians (Kemeru Gessese washes clothes in a river) live in regions where the disease is rampant.

300 million people worldwide are incapacitated by malaria infections. The disease's aches, fever, chills and other flu-like symptoms not only inhibit economic productivity but also suppress immune systems in its victims, making them more susceptible to tuberculosis and AIDS—both of which kill even more people than malaria does—and other life-threatening ailments.

"We can control malaria—absolutely," Carter was saying, standing in the dusty courtyard of a clinic in the village of Afeta. Vultures wheeled overhead, and farmers in faded clothes lined up to receive new mosquito nets from the hands of the former president. Dressed in a blue plaid shirt and blue jeans festooned with a silver "J.C." belt buckle, Carter noticed an old woman struggling to unpack her net. He pulled out a pocketknife, sliced open the heavy plastic packaging and presented the net to her. "There you are," he said, flashing the smile.

Abdela Abawori (above, right) and Nefisa Abdela still mourn the loss of a daughter to malaria. The mosquito-borne disease is the leading cause of death in Ethiopia (opposite).

The nets, treated with long-lasting insecticide, cost $5 each, but the villagers got them free, courtesy of the Atlanta-based Carter Center, the Ethiopian government and a host of other donors. While the villagers collected their nets, an entourage of reporters, documentary filmmakers, Secret Service agents and Ethiopian health workers got a malaria lecture from the one-term president and Nobel Peace Prize winner, who had been making foreign forays like this one—to fight disease, monitor elections and defuse international conflict—since founding the Carter Center with his wife, Rosalynn, in 1982.

"Most of those who die from malaria are little children, 1 to 5 years old," Carter said as villagers huddled nearby, deploying their umbrellas against the rising heat. "It's been around so long that people have become inured to it. We hope to demonstrate that we can do away with malaria in a major country. It will be an example to other countries of what can be done."

Carter and his colleagues have already demonstrated what can be done in 17 African countries to prevent or treat debilitating diseases such as Guinea worm, trachoma, lymphatic filariasis, schistosomiasis and river blindness. All are classified by the World Health Organization as "neglected tropical illnesses." "What that means is that they can be prevented or eliminated with proper treatment," Carter told me. "These neglected diseases have disappeared in most of the developed world. In just a few years we've almost eliminated Guinea worm, which has gone from three and a half million cases down to about 25,000—a 99.3 percent decrease. We treat about ten million people a year to prevent onchocerciasis, or river blindness. We're making progress with trachoma, which is the leading cause of preventable blindness in the world. We're helping to train a corps of healthcare workers through seven universities here in Ethiopia, so that even people in the most remote areas will have access to treatment. The success with these programs gives me confidence that we can have some impact on malaria."

CARTER HAD COME too late to help little Amzia Abdela, a 2-year-old who died in 2006. She had lived deep in southwest Ethiopia, where farmers still turn the earth with wooden plows and plodding oxen, where goats sleep in red dirt roads and hornbills flap languidly from banana trees.

"She was shivering," recalled the girl's father, Abdela Abawori, a farmer in the village of Keta Chole. "She had a hot fever and a headache. Her joints were aching. My daughter was sick for almost two months. By the time we called the malaria worker, it was too late." We conversed through Abate Tilahun, a program officer in the Carter Center's Addis Ababa headquarters. Abate, soft-spoken and courtly, translated from English to Amharic, a musical tongue with Semitic roots that is the official language of Ethiopia.

In short order, Abate had established that Abdela and his wife, Nefisa, 35, have six other children, including a boy born the month before. In a few weeks, the rains would come again, and Abdela would plant his maize. I asked about last year's harvest.

ROBERT M. POOLE *is a contributing editor to* SMITHSONIAN. *His "Lost Over Laos" appeared in August 2006. Trained as an artist, photographer* **ANTONIO FIORENTE** *lives in Addis Ababa.*

"Abdela says he grows 1,300 pounds of maize a year," Abate said.

"That sounds pretty good."

"Oh, no, it's not nearly enough," said Abate. "He says the family will suffer. They need at least 2,600 pounds to get by. He says they have to fill up on bananas and stuff."

Abdela was painfully thin, his face lined with wrinkles, making him appear much older than his 40 years. He had straw in his hair, and he wore ragged pants held together by patches. Rubber boots flapped around his skinny legs, and his double-breasted coat was ripped at the shoulder. Yet he was uncomplaining and dignified, an upright man who had already lived through a vicious Marxist regime, followed by years of turmoil, drought, war and now a young death in the family. He had learned to take the blows and carry on, as resilient as Ethiopia itself.

Like many in this proud country, Abdela knew that Ethiopia has never been colonized by foreign powers. It also has its own ancient script, its own branch of the Orthodox Church, even its own way of keeping time—by the Ethiopian calendar it is 1999 and its millennium is still in the future. "These things make us unique," said Teshome Gebre, a resolutely buoyant man who heads up the Carter Center's health operations in Ethiopia. "We also claim to be the source of humanity—not only for Africa but for the entire world because of Lucy," he said, referring to the 3.2-million-year-old hominid fossil, *Australopithecus afarensis*, discovered in northeast Ethiopia in 1974.

Abdela led me uphill, past fenced gardens and scraggly coffee trees, arriving at a truncated summit where he pointed to a pebbly mound of earth sprouting weeds. "She's just here," he said. He took a step around the little grave, not a yard long. "My mother is here with her," he added, indicating an older burial at right angles to the first. Neither was marked.

The sounds of morning wafted up the hillside—children laughing, plowmen whistling to their oxen, roosters crowing in the sun. Abdela uprooted the weeds obscuring his daughter's grave and threw them aside. "I miss her," he said softly. "Of course I have a strong feeling of losing my daughter. I think about her and I fear for my family."

"Why is that?"

Abate translated: "He says almost all of his children have been attacked by the malaria. Others could die."

Elsewhere in Ethiopia, I would meet parents who had great expectations for their children, as prospective doctors, teachers, lawyers. Abdela's ambition was more basic—he simply wanted his children to live. That was enough for now.

Abdela led me to his little house, where two goats were tethered by the entrance and smoke from a cooking fire coiled toward the sky. His 4-year-old daughter, Adia, rushed out to greet us. He scooped her up in one arm, and with the other threw back the frayed cloth flap that served as his front door. He ushered me into his darkened house, where I could make out two new mosquito nets hanging in the gloom. The whole family had been sleeping under them for a week. During that time, Abdela had made an important discovery.

"When I woke up after the first night," he said, eyes widening with wonder, "there were dead mosquitoes all around! Dead flies too!"

BY THE TIME Carter arrived in Ethiopia in February, the first of 20 million bed nets were in country—roughly two for each household in malarial areas—dispatched by airplane, truck, bus and even donkey cart. Prime Minister Meles Zenawi, a longtime supporter of Carter's Ethiopian initiatives, had agreed that his government would distribute 17 million nets; the Carter Center would hand out the remaining 3 million in areas where it operated other health programs. Under an agreement with the Ethiopian government, the Carter Center will monitor the nation's malaria program until 2015, by which time it is hoped that epidemics of the disease will be relegated to a chapter of Ethiopian history. The Carter Center's cost would be $47 million, one of the organization's biggest investments ever.

MAP: MARK REAGAN

Since the late 1800s, it has been known that bed nets could prevent malaria by shielding humans from marauding *Anopheles* mosquitoes. The female mosquitoes, which make their rounds by night, inject victims with malaria parasites. Of the four species of these parasites, the most common and most dangerous is *Plasmodium falciparum*. They lodge in the liver, where they remain dormant for a period of ten days or so before flooding into the bloodstream. There they destroy

red blood cells by the tens of thousands, which triggers the characteristic symptoms: "Coldness overtakes the whole body. Tremors . . . accompany the cold sensations, beginning with the muscles of the lower jaw. . . . The expression has meanwhile changed: the face is pale or livid; there are dark rings under the eyes; the features are pinched and sharp, and the whole skin shrunken," according to a 1911 account, still accurate today. Most of the 300 million to 500 million people infected worldwide survive a malaria attack, which may arm them with a resistance that makes future attacks less debilitating. In some cases, the parasite remains in the body and emerges weeks or even years later to cause a relapse; perhaps 15 percent of cases in Ethiopia are recurring.

If you could avoid the insect's bite, however, you could avoid the disease. The new nets blanketing Ethiopia add a high-tech twist to the old protective strategy: they not only block the insects, but, as Abdela Abawori had discovered, they kill any that come in contact with the nets. They have the insecticide deltamethrin woven into the mesh, and with no apparent risk to humans, they retain their mosquito-killing potency for up to seven years.

Insecticide-laced bed nets (distributed by Jimmy and Rosalynn Carter, above; in use, opposite) kill the bugs that land on their surface. "You are the bait under the net," says a health official.

Carter explained: "We first got involved with bed nets in Nigeria, where we've used more than 100,000 to control lymphatic filariasis, or elephantiasis. The problem with the old nets was that they had to be reimpregnated every year. So you had to go back into every village and every home to keep the nets working. It was an almost insurmountable problem. This new technology makes it a one-shot deal. It doesn't just repel mosquitoes—it kills them. It *kills* them! This would not have been possible several years ago."

Carter's organization is not the only one to deploy this latest armament in the mosquito wars. A group called Malaria No More, a nonprofit collaboration between American business groups and charities, is distributing more than a million new insect-killing nets in other African countries. President Bush has launched a five-year, $1.2 billion initiative against the disease, to help purchase and distribute new nets, to provide malarial drugs for treatment and prevention during pregnancy, to spray insecticide indoors and to boost public education. Others have stepped up with financial commitments for a worldwide campaign: the Global Fund to Fight AIDS, Tuberculosis and Malaria has promised $2.6 billion for nets and drugs; the World Bank $357 million in loans for affected countries; the Bill and Melinda Gates Foundation $303.7 million for research on vaccines.

The new attention would help the former president's fundraising efforts. "I have absolute confidence in our Ethiopian project, as much as I have had in anything we've done," he said. "We're not just doing it spasmodically, just giving out nets in one village and skipping others. We're going everywhere. We're doing it comprehensively."

A few days later, the former president returned to the United States to solicit contributions for his Ethiopian campaign and to resume a busy schedule, commenting on the passing political scene, teaching a Sunday school class in his native Plains, Georgia, and writing books. He has written more than 20 since leaving the White House, many of them bestsellers. His latest, provocatively titled *Palestine: Peace Not Apartheid*, created a storm of protest for criticizing Israel—and expressing sympathy for the Palestinians—and led to several resignations from the advisory board of the Carter Center.

IT IS TOO SOON to tell if Carter's malaria crusade will succeed. But the organization's track record suggests cause for hope on a continent where that can be rare. After Carter departed Ethiopia, I remained behind to see how his colleagues were handling established campaigns against river blindness and trachoma, two devastating diseases that have long plagued this country of rumpled mountains and foaming rivers.

Those rivers were part of the problem. Day after day, I saw women doing their wash in the swift current, where boys gathered water in goatskins and men watched over cattle slurping from the river. The same waters were home to a black fly of the *Simulium* species, a nasty little customer that cut a wide swath in Ethiopia, infecting more than 3 million people with onchocerciasis, or river blindness, and

placing some 7.3 million at risk for the disease. The flies feed on human blood. In the process, they infect their hosts with the parasite *Onchocerca volvulus*, which gives the disease its scientific name. Once inside a person, the worm-like parasites live for up to 15 years, producing millions of little worms called microfilariae. These crawl under the skin, causing inflammation, lesions, intense itching and a mottling of the epidermis known as "leopard skin." In severe or prolonged cases, they may migrate to the eyes, causing impaired vision or blindness.

By the time 78-year-old Mekonen Leka turned up at the Afeta health clinic in February, he was complaining of blurred vision and intense discomfort. His bony shins and ankles were spotted with the white blotches characteristic of onchocerciasis, and long, livid scars ran up and down his legs from constant scratching. "I feel like there's something crawling around under my skin," he said, reaching for a sharp stick to dig at his shins once more. He sat propped against a tree, his legs splayed before him, telling his story: he was infected six years ago, while planting coffee near the river; the itching kept him from sleeping; that, in turn, kept him from working; one of his children took care of him; he could still see well enough to get around, but he worried that his eyesight would get worse.

"It makes me very weak," said Mekonen. "I have come to the clinic to beg for medication to stop the itching," he said.

The medication was ivermectin, a drug originally developed for deworming cattle and dogs and now produced for people as Mectizan by Merck & Co., which donates the doses. In 2006 alone, the Carter Center distributed more than 2.5 million treatments to Ethiopians. Administered once a year in tablet form, the drug does not kill the adult worms, but it controls the spread of their offspring, which gives patients like Mekonen immediate relief from itching. More important, it

Nearly one million of Ethiopia's 75 million people are blind, among the highest rates in the world. Clinics supported by the Carter Center (eye specialist Mulat Zerihun examines a boy) have saved the sight of 67,000 people who suffer from trachoma.

will ensure that his vision would deteriorate no further.

He would have to wait a few weeks for the drug, when area health clinics planned a massive treatment. I witnessed several of these drug campaigns, which were run and attended by Africans. The events were announced in local markets and promoted on posters, resulting in hundreds of patients showing up for medicine on a specified day. Nobody just pocketed his pills and went home, but swallowed them under the watchful eye of health workers who dutifully recorded each patient's name in a bound ledger, measured his or her height with a wooden stick, and determined the proper dosage accordingly.

"Our number one complaint is still malaria," said Yeshimebet Moges, the chief nurse at the Afeta health clinic, where patients were lined up 30 deep for afternoon checkups. "But we're seeing a lot of onchocerciasis patients too. They itch; they get the treatment; the complaints disappear. And there's a side benefit—a lot of people have discovered that the medicine also gets rid of intestinal worms and other parasites, which can be a big problem for children. Our patients are really grateful—they bring us coffee, bananas, avocados, oranges." A few satisfied customers have even named their children Mectizan, a tribute to the drug that healed them.

Mectizan means that millions of children will not go blind or know the misery that onchocerciasis has visited on their elders. With luck, a new generation might be well enough to attend school instead of suffering at home or staying there to nurse a sick parent. "If one family member is taken out of production because of sickness, it affects the whole family and eventually the economic development of Ethiopia," said Teshome Gebre. "This is one of the reasons we have a poor country. You need healthy working people if you want to reach the dream of economic progress."

IT HAD BEEN A LONG WHILE since Sintayhu Tegegn, 45, felt well enough to work. The widowed mother of three sons had contracted trachoma, a bacterial infection occurring throughout Ethiopia, and now she suffered from trichiasis, a late stage of the disease that affects a million Ethiopians and requires immediate surgery to preserve sight; another 15 million to 20 million have an early phase of the ailment, which can usually be arrested by antibiotics.

"My eyes started hurting two years ago," she told me, as we sat outside a village clinic in Merawi, a dot on the map in northwestern Ethiopia. Along with several hundred patients, she was awaiting eye surgery. "The pain has become unbearable," she said, tightening a white cotton shawl around her head to screen out the sunlight. "I have trouble cooking for my family because the smoke irritates my eyes. Sometimes I can find a neighbor to help me—sometimes I just have to go to the kitchen and endure the pain because there's nobody else to feed my family. I can't sleep because of the pain. I can't close my eyes. If I do, then I can't open them because of the pain." She had them closed as we spoke.

The disease, known from ancient times, is transmitted by flies or spread from person to person. The vector, a fly known as *Musca sorbens* (cousin to our familiar housefly, good old *Musca domestica*), swarms around the eyes and runny noses of children, feeding on the moisture and leaving behind a microorganism called *Chlamydia trachomatis*. Infections from the microorganism settle under the eyelids, which become inflamed and thickened. With time the lids begin to scar from the inside, causing them to curl in upon themselves. When this happens, inverted eyelashes begin to scratch the cornea, which eventually clouds over like frosted glass, causing blindness. In Ethiopia, where the disease is known as "hair in the eye," the ailment afflicts primarily children and the women who care for them.

"It is very much an illness of gender," said Mulat Zeri-

hun, the eye surgeon in charge of the Carter Center's trachoma programs for the sprawling Amhara region. He worked his way through a sea of patients waiting to be screened in the Merawi clinic. When he came to Sintayhu Tegegn, he pulled his magnifying goggles into position, cupped her chin in his hands and tilted her head up. Like many suffering from late-stage trichiasis, Sintayhu had found respite by plucking her eyelashes with tweezers, which more than a few patients wore like amulets around their necks. "Pulling the lashes helps for a day or so," Mulat said, but then they grow back, sharp and bristly, and they scratch the eyes worse than before.

Mulat peeled back Sintayhu's eyelids, studied her for a moment and announced a verdict: "Both eyes will be all right. There's no clouding on the cornea. You will feel a lot better in a few days." Mulat plunged back into the silent crowd while Sintayhu's 15-year-old son led her into a small room where surgeons were already at work on one patient.

Sintayhu was lucky to fall under the care of Mitikie Wondie, 34, an ophthalmic nurse suited up in a surgeon's cap, mask and latex gloves. She settled Sintayhu on the table, draped her face with a sterile cloth and told her to hold steady. After injecting each eyelid with local anesthetic, Mitikie went to work: she threaded a needle through the upper lid of one eye, pulled it up with a loop of silk and slid in a stainless steel retractor to hold the lid in place; with a scalpel, she made a small incision along the margin of the lid and the tarsal conjunctiva; this relieved tension on the damaged eyelid, which allowed her to unfold the eyelid, freeing it from scraping against the cornea; with the lid restored to its proper position, Mitikie closed the incision, squeezed antibacterial ointment in the eye and patched it down with gauze, repeating the process on Sintayhu's other eye. All through the 12-minute operation, Sintayhu lay bare-

Ethiopia is haunted by debilitating diseases (women line up at a clinic in Afeta), but "our number one complaint is still malaria," says head nurse Yeshimebet Moges. Patients bring chickens, fruit and other gifts to show their gratitude.

foot and unflinching on the table, watched over by four surgical assistants who handed equipment to Mitikie, swabbed blood from Sintayhu's eye and listened intently as Mitikie described what she was doing. The assistants were in training, and would soon be allowed to perform a few operations under Mitikie's supervision.

"We'll probably perform 40 surgeries in this clinic today," Mulat said, "and another 40 down the road in Dur Bete. We could do more, but we're giving these young people exposure to training, so they will be able to do what Sister Mitikie does." His honorific title for Mitikie referred to her position as a nurse, not to holy orders. When he praised her, she shrugged, pulled on fresh gloves and went to work on a new patient, one of the 67,000 trachoma surgeries the Carter Center has coordinated in Ethiopia since 2000.

Sintayhu, meanwhile, was ready for home. She stood a little unsteadily, her eyes taped with gauze, and called for her shoes, pointed and black with red stars on each toe. She pulled her shawl protectively over her head, locked arms with her son and went out into the light. With him on one side, a niece on the other and a neighbor following, Sintayhu navigated a passageway crowded with patients, stepped gingerly into the clinic's sunbaked courtyard and disappeared through a gate. Now maybe she could sleep.

The eye-saving surgery at Merawi and other rural clinics was but one component in Carter's multifaceted campaign against trachoma. The Carter Center also works with the Ethiopian Health Ministry and volunteer groups such as Lions Club International to distribute antibiotics from Pfizer, Inc., which has donated 5.5 million doses of Zithromax, its version of azithromycin. The drug not only arrests trachoma but also knocks out a wide range of other ailments, among them scabies, lice and the respiratory infections that haunt children.

The trachoma initiative also includes a public education campaign emphasizing the importance of face washing and hygiene in preventing the disease. To encourage such washing, the Carter Center and the Lions Club have drilled more than 119 community wells in the region. And in order to stop trachoma at its source, the former president has inspired an unprecedented sanitation campaign.

"I used to be known as the president who negotiated peace between Egypt and Israel," Jimmy Carter told a recent gathering of health workers in Addis Ababa. "Now I'm known as the number one latrine builder in the world."

The flies transmitting trachoma breed in human feces. In the fields where they spend all day and sanitary facilities are unknown, farmers have traditionally squatted behind any convenient bush or maize plot. "As you can see, we live in a big country," Mulat said as we drove through yellow fields and lumpy mountains bordering Lake Tana, where the Blue Nile uncoils on its long journey toward Sudan. "Our tradition is to defecate outside in the fresh air under the sky. This is what the farmers have always done."

Farmers were indignant a few years back when Mulat began talking about the link between trachoma, flies and toilet habits, and suggested that latrines could help. "Why should we change?" Mulat recalled them asking. "Our ancestors did it this way. We do it this way! We've been to cities. Their latrines smell terrible!"

To answer such complaints, Mulat staged latrine-building workshops in a few communities, with raffles. "The lucky winner got a latrine," Mulat said. Neighbors did the construction, using simple materials such as saplings and cornstalks. "Once people saw how the latrines worked and they started using them, they really liked them—especially the ladies." In this conservative region, women had been suffering for years because it was a cultural taboo for them to defecate in daylight, when they could be seen. "It brought shame and ridicule on your family," Mulat said. "They basically had to go to the bathroom at night, which could be very inconvenient."

Carter insists that the key to fighting disease in Africa (Adis Tegenye leads a blind companion to a market in the highlands) is to make sure that "the work is done by local people."

With women leading the charge, latrine fervor soon swept the Amhara region, where more than 300,000 new household privies have been built since 2002, far beyond the 10,000 that health officials initially had in mind. Neighbors competed to see who could build the best one.

Having visited a few of those reeking city latrines the farmers complained about, it was with some trepidation that I made the half-hour hike down a broken boulder field, across a sluggish creek and up into the scrubby hills near Lake Tana to meet Wallegne Bizvayehu, a farmer who proudly showed me his family privy, one of 300 new sanitary facilities in his village of 6,000. It was a simple structure about ten feet deep and three feet wide, with airy walls of woven maize stalks and a slanting thatched roof lined with an orange plastic tarp. Wallegne's outhouse was a clean, odorless, well-swept building, with thin bars of sunlight shining through the walls, and not a fly in sight—an island of unaccustomed privacy in a village of barking dogs, farm chores and family obligations.

"Since we built it I believe we've been healthier," Wallegne said. "We've decreased our visits to the nurse's station." Inspired by Wallegne's example, three neighbors were building new latrines. "They'll build them themselves," Wallegne said, "but of course I will help if they need it."

THIS SEEMED TO ME the salient lesson of Jimmy Carter's efforts in Ethiopia, where Africans were helping Africans. The former president made the high-level contacts with prime ministers and health officials, then went home to raise the contributions. He gathered a small but talented technical staff in Atlanta to supervise and plan projects. But they remained largely invisible on the ground in Africa, where the recent history of charity has been written in overblown promises, unrealized dreams and squandered billions.

"Most of the money spent on foreign aid never gets to the suffering people," Carter told me. "It goes to the bureaucrats and to wasteful contractors. There's data showing that for every $100 in available aid for the control of disease and suffering in Africa, only $20 gets to the people who need it."

Determined to improve upon that record, Carter (a notoriously frugal child of the Great Depression) has kept his expenses low, infrastructure small, accounting systems rigorous and expectations reasonable. Over the past two and a half decades in Africa, he has been happy to take small steps, to build upon them and to let local people take credit for the programs that work. In Ethiopia, he has drafted respected professionals such as Teshome Gebre and Mulat Zerihun, who built their own network of indigenous helpers. These villagers were the ones who went to the markets and made the announcements of forthcoming clinics, kept the records, dispensed the medicine, trained the nurses and performed the eye surgeries.

"That is the key to success," said Carter. "We don't come in to impose something on a country. We get invited. We help. But all the work gets done by local people."

And now local people were fanning out to make sure the nets were properly deployed all over Ethiopia, which may yet win its long struggle with malaria.

Join President Carter for a live chat June 28 at 11:15 a.m., E.S.T., at Smithsonian.com/carter.

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Risks and Riddles

The Soviet Union was a puzzle. Al Qaeda is a mystery. Why we need to know the difference

BY GREGORY F. TREVERTON

U.S. intelligence approached the Soviet military (a 1965 parade in Moscow) as a puzzle—the sum of its weapons and units.

THERE'S A REASON millions of people try to solve crossword puzzles each day. Amid the well-ordered combat between a puzzler's mind and the blank boxes waiting to be filled, there is satisfaction along with frustration. Even when you can't find the right answer, you know it exists. Puzzles can be solved; they have *answers*.

But a mystery offers no such comfort. It poses a question that has no definitive answer because the answer is contingent; it depends on a future interaction of many factors, known and unknown. A mystery cannot be answered; it can only be framed, by identifying the critical factors and applying some sense of how they have interacted in the past and might interact in the future. A mystery is an attempt to define ambiguities.

Puzzles may be more satisfying, but the world increasingly offers us mysteries. Treating them as puzzles is like trying to solve the unsolvable—an impossible challenge. But approaching them as mysteries may make us more comfortable with the uncertainties of our age.

During the cold war, much of the job of U.S. intelligence was puzzle-solving—seeking answers to questions that had answers, even if we didn't know them. How many missiles did the Soviet Union have? Where were they located? How far could they travel? How accurate were they? It made sense to approach the military strength of the Soviet Union as a puzzle—the sum of its units and weapons, and their quality.

But the collapse of the Soviet Union and the rise of terrorism changed all that. Those events upended U.S. intelligence, to the point that its major challenge now is to frame mysteries, as I learned as vice chairman of the National Intelligence Council, managing the process for producing National Intelligence Estimates.

To analysts in the Pentagon, for instance, terrorists present the ultimate asymmetric threat. But the nature of the threat is a mystery, not a puzzle. Terrorists shape

HULTON ARCHIVE / GETTY IMAGES

themselves to our vulnerabilities, to the seams in our defenses; the threat they pose depends on us. The 9/11 hijackers, for instance, did not come to their plan of attack because they were aviation buffs. They came to it because they had identified gaps in our aviation defenses.

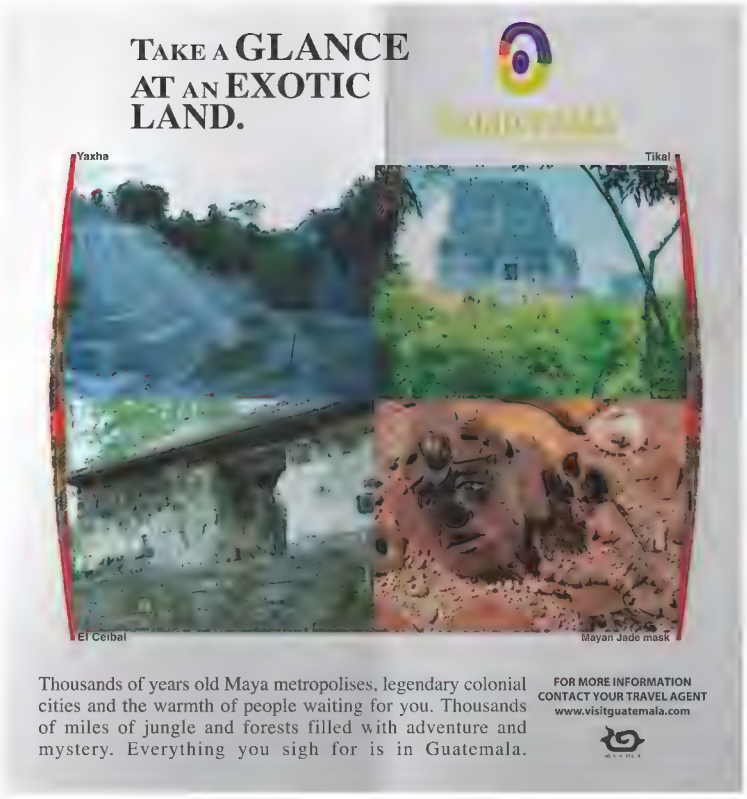
Whether Saddam Hussein's Iraq had nuclear or chemical weapons seemed a quintessential puzzle, and U.S. intelligence treated it that way. And got it wrong. But suppose the issue of Iraq's weapons of mass destruction had been treated not as a puzzle but as a mystery. That might have turned the exercise away from technical details and toward Saddam's thinking. It might have raised the question: Could Saddam be more afraid of his local enemies than he is of the United States? Could that lead him to boast that he had weapons he really didn't have?

PUZZLE-SOLVING is frustrated by a lack of information. Given Washington's need to find out how many warheads Moscow's missiles carried, the United States spent billions of dollars on satellites and other data-collection systems. But puzzles are relatively stable. If a critical piece is missing one day, it usually remains valuable the next.

By contrast, mysteries often grow out of too much information. Until the 9/11 hijackers actually boarded their airplanes, their plan was a mystery, the clues to which were buried in too much "noise"—too many threat scenarios. So warnings from FBI agents in Minneapolis and Phoenix went unexplored. The hijackers were able to hide in plain sight. After the attacks, they became a puzzle: it was easy to pick up their trail.

Solving puzzles is useful for detection. But framing mysteries is necessary for prevention.

That's one reason the FBI embarked on a change of mission after 9/11, from almost pure law enforcement to intelligence—from solving puzzles to framing mysteries. That change in mission requires an enor-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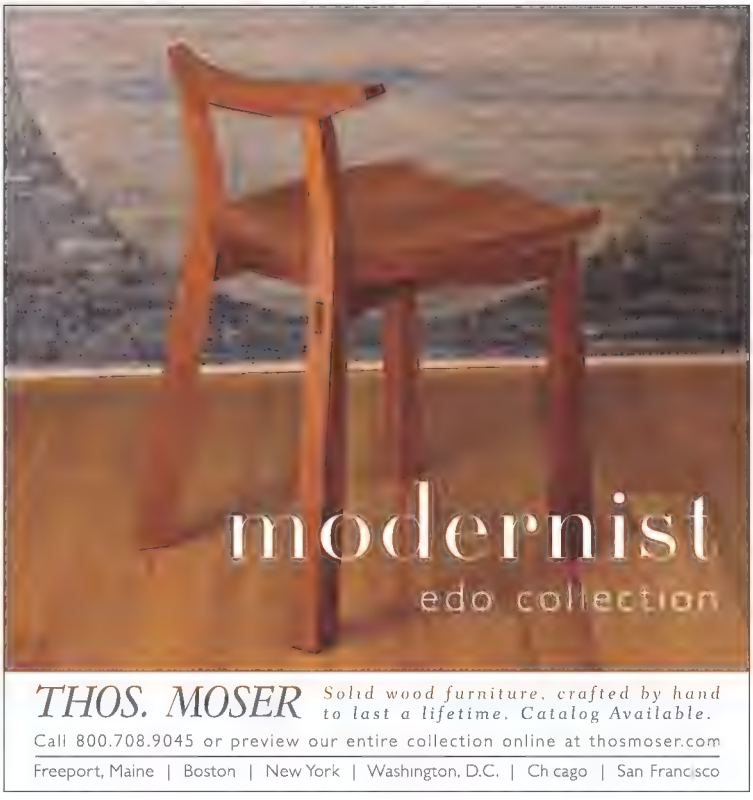
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mous change in organizational culture. For the puzzles of law enforcement, the measures of effectiveness are pretty clear—you can count the suspects collared and bad guys convicted. Terrorists, however, may commit but one crime, and by the time they do, it is too late. That scarcity of "collars" is a main reason why, rhetoric aside, counterterrorism was not a marquee FBI mission before 9/11.

For the mysteries of intelligence, measures of effectiveness are elusive. The goal of prevention is . . . nothing—an absence of attacks. But if no major terrorist attack occurs, does that represent the effectiveness of prevention, simple good luck or the fact that the threat was overstated in the first place?

That's one uncertainty we'll have to learn to live with. There are others that framing mysteries can help us understand.

NO MATTER HOW MUCH patients may seek the clarity of a puzzle, healthcare, too, is largely a mystery. The goal of medicine, like that of counterterrorism, is an absence—of illness and disease. Achieving that goal depends on many different factors. Behavior matters, but only in some complicated interaction with propensity; what is lethal obesity for one person is only a nuisance for another. Tests are imperfect predictors of illness, and treatments interact or have side effects.

While few doctors would put it this way, they act upon something that might be called Bayesian mystery framing. Bayes' theorem is a statistical technique for adjusting subjective probabilities in light of new, but inconclusive, evidence. Doctors base an initial assessment of a patient's health on propensity, as revealed by his or her medical history, and on diagnosis, determined through an examination. If the doctor's initial assessment is of a high probability of disease, he or she orders more tests, which in turn refine that probability. For chronic concerns, such as high blood pressure leading to heart disease, the initial assessment leads to a decision about whether and

Approaching problems as mysteries—not puzzles—may help prevent calamities such as the 9/11 World Trade Center attack (top) and the Enron collapse (former chairman Ken Lay, bottom).

JUSTIN LANE / THE NEW YORK TIMES / REDUX. RICHARD CARSON / REUTERS

how to treat, followed by subsequent tests to see if the original probability of problems can be revised downward.

Most discussions about energy, as well, treat it as a puzzle: so many million barrels of proven reserves in country X, production to "peak" in country Y at a particular date and so on. From a geological point of view, the puzzle perspective makes sense: any individual drill hole or field has so much oil. Yet energy futures are a mystery, not a puzzle. How much oil a given well can produce is not the same as how much oil is there: whether it makes sense to use secondary or tertiary recovery methods after primary methods no longer suffice depends on price. And beyond a

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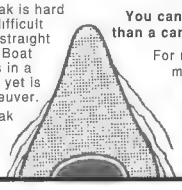

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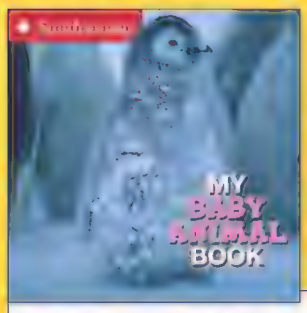

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single well, the factors multiply. How fast will the global economy grow? What new energy discoveries will be made? Which alternative sources will come on line at what price?

In a recent issue of the *New Yorker*, writer Malcolm Gladwell made a fascinating observation about the Enron scandal. He noted that law-enforcement investigators and, later, prosecutors treated the case against former Enron CEO Jeffrey Skilling as a puzzle: Enron either lied or dissembled about its finances; either way, the public received too little information.

But a year before the scandal broke, Gladwell also noted, several financial analysts treated Enron as a mystery. Parsing the company's voluminous financial statements and quarterly findings, they realized that its vaunted profits—it claimed $111 billion in revenues in 2000—constituted a giant mystery: that is, the gains had not yet been realized, and depended on events that had not yet occurred. The company's actual cash flow was virtually nil. The analysts pursued the matter with Enron, and the company flew its accounting team to Dallas for a meeting. For the mystery-framers, the challenge was not too little information, but too much noise. A summary of a single set of Enron's complicated financial deals would have come to over a hundred thousand dense pages.

Ultimately, the mystery ended calamitously, as Enron's profit scenario failed to materialize, and the company collapsed. At that point, Enron became a puzzle, and the prosecutors' approach to solving it worked. After Skilling was convicted of fraud, he was sentenced to 24 years in prison, one of the most severe prison sentences ever given for a white-collar crime.

You might say that the puzzle-solvers succeeded, in that criminality was punished. Or you might conclude that the mystery-framers failed, in that the crime was not prevented.

GREGORY F. TREVERTON *is the director of the RAND Corporation's Center for Global Risk and Security.*

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EVER SO RARELY, a long-lost treasure comes to light, unearthed in an attic, at a bric-a-brac sale, in the false drawer of an ancient piece of furniture. In this case, a British journalist, who himself would come to be regarded as a treasure on both sides of the Atlantic, had relegated an unpublished manuscript to the dustbin nearly 60 years ago. The work, by Alistair Cooke—host of "Masterpiece Theatre" on PBS from 1971 to 1992—surfaced in 2004. Cooke's discerning secretary, who was clearing out papers in his Manhattan apartment a few weeks before the broadcaster's death at the age of 95 in March of that year, rescued the manuscript. Now Cooke's reportage appears in the form of a book entitled *The American Home Front: 1941-1942*.

When the United States entered the war in 1941, Cooke, an Englishman who had recently become an American citizen, was working as a correspondent for the BBC in New York City. He immediately undertook what was, for the time, a daunting assignment: to trans-navigate the entire country, coast to coast and north to south, reporting on America's state of mind as its citizens assumed a new role as allies of al-

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ready war-torn England. The challenge lay not so much in the journey ahead as in securing the means to make it. Gasoline and tires were severely rationed; railways, carrying troops, were impossibly crowded.

Cooke portrays an America gearing up for war in the shadow of the Great Depression. In Charlestown, Indiana, for example, he met a couple he identifies only as "a Texan and his wife." Like tens of thousands of others, they had traveled great distances to find jobs, in this case, at a new gunpowder plant, then the largest in the world. "They had tried," Cooke reports of their odyssey, "sleeping in a drugstore cellar, a firehouse, a barn with a patched roof, a trailer. . . . Through a winter and a spring and a steaming, rancid summer they came and settled and somehow stayed fed and alive."

Cooke punctuates his story with the testimony of ordinary people, those who could not fathom the arcane economic decisions of Washington's War Production Board any more than they had comprehended the programs of the Works Progress Administration that had preceded it. Midwestern farmers, for instance, complained that despite drastic nationwide bread rationing, they themselves saw nothing but surplus, "storing [wheat] in schoolrooms and empty stores, in churches, in railroad shops, and in garages closed down for lack of gasoline and customers." The problem, they believed, could be attributed to "the incompetence of 'the men in Washington' who cannot provide enough boxcars to get the wheat away from Kansas." (The real issue was that the government wanted to stockpile against any future shortages.)

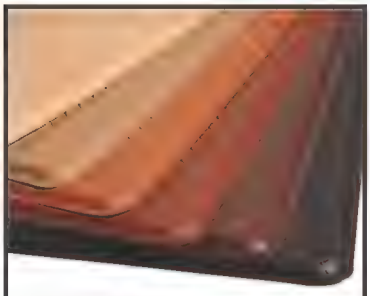
Cooke writes movingly of the nation's response to horrific shipping losses from German U-boat attacks in the Atlantic. Wisconsin farmers and Florida growers, he reported, sent their products to factories where tons of milk, eggs and oranges were processed into shipments of powdered milk and eggs and concentrated citrus juice that were transported across the

ocean so that half-starved British children could have a proper breakfast. And at shipyards and factories on both coasts, he found the nation rallying to the war effort. In California, industrialist Henry Kaiser, who had overseen the construction of dams before the war, had his factories producing "liberty ships" at the unheard of rate of one a month. In Detroit, too, Cooke writes, tanks and airplanes were moving off assembly lines at a stupendous pace.

In small towns, most men had gone off to the military or the war plants, leaving behind the kind of scene Cooke recorded on the Great Plains: "a mother in a floppy hat plowing a cornfield, and two daughters bent over low in the beet fields." He began, also, to chronicle sorrow and loss. In Deming, New Mexico, for example, Cooke found an entire town in shock: their local state guard unit, 150 men, had been posted to a place in the Philippines called Bataan, which had fallen ten days before; not one of them had been heard from. In Pasadena, California, an auto dealer told him that unscrupulous speculators were "looking for cars with good rubber and making heavy profits on the immediate resale." In Vermont, a state famous for its high-quality marble quarries, he discovered local citizens who predicted a grim upsurge in business: chiseling tombstones for fallen soldiers.

Cooke's narrative captures the whole of the American scene in vivid detail, from Chicago slums to smoke-belching factories of the East and the Midwest, to the boundless beauty of the desert and the mountain states. Many of his observations were broadcast worldwide over BBC airwaves, but by the time Cooke finally turned them into a book in 1945, the public wanted to forget the war. No publisher was interested, so there the matter rested for more than 60 years. We rediscover it now, timeless in its eloquence.

WINSTON GROOM *is the author of* 1942: The Year That Tried Men's Souls.



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Have you heard about an evolution of human behavior that is occurring? Also, why and how that evolution is being accomplished? If you are interested, please continue to read and ponder the following information.

Richard W. Wetherill
1906-1989

Inasmuch as the writer of this text is untrained in scientific reporting, past and present behavior patterns will simply be stated for reader's consideration.

Actually, this information had been presented during the 20th century by the late Richard W. Wetherill in his study, humanetics. The wording here is somewhat different, but Wetherill's identification of ***a natural law of behavior*** makes this presentation possible.

Scientists have published data indicating that more than four billion years ago whoever or whatever created the planet Earth later also created species of flora, fauna, sea life, fowls, and animals. Then after additional millennia, primitive humans appeared.

Realize that when they appeared, neither instructions nor languages existed. So, in the beginning, they mimicked the behavior of animals. They learned to fight, both killing predators and becoming predators, themselves. In addition, animal patterns of scheming and trickery were also copied. But, unlike the animals, humans' unique ability to reason enabled their behavior to continue evolving.

Still later, humans recognized that by gratifying their own selfish interests, they had achieved a higher standard of living and a longer life.

Another plateau was reached when those evolved humans began sharing and aiding others with acts of altruism. They noticed a kind of reciprocal feeling that they valued above the reciprocity they had received from their prior selfish attitudes. That pleased them.

Evolving from the level of altruism, people began unselfishly to share funds and services with the needy, the sick, and people who were physically or mentally challenged. However, certain animal patterns persisted in justified, more subtle ways.

The evidence is that modern language still illustrates a carryover from humans' initial copying of animal behavior expressed in such phrases as fighting like cats and dogs, stubborn as a mule, and sly as a fox.

We think evolutionary behavior advanced in the 1920s when Wetherill published his insight into creation's formerly unidentified ***law of absolute right***.

People learned that their behavior had to be logical, practical, and moral to avoid serious consequences, and some few complied by adhering to nature's law rather than reasoning from their own personal choices.

Having learned about the ***law of absolute right***, people are now abandoning unconscious animalistic patterns such as fighting — within them and with others. But inasmuch as natural laws are inviolable, self-preservation depends on thoughts, words, and actions that are inclusively logical, practical, and moral. Such persons now compose a microcosm of a truly civilized society.

In addition, we believe that since this information emerged in the USA, right-minded citizens could spearhead the application and spread of creation's ***law of absolute right***. Because it has ascendency, we also believe that somewhat mysteriously, right thinking then will motivate vast numbers of people and that dissenters will not survive.

People who think, say, and do what accords with the law of right action are those who never give, invite, nor take offense. They are rational, moral, and peaceful. Since nobody escapes the action of a natural law, those who continue to defy or ignore it will invite their demise. Nature's law of absolute right indicates the creator's intent to lift people from adversarial chaos to a level of absolute rightness for all those who comply!

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Text by E. Marie Bothe, president of The Alpha Publishing House.

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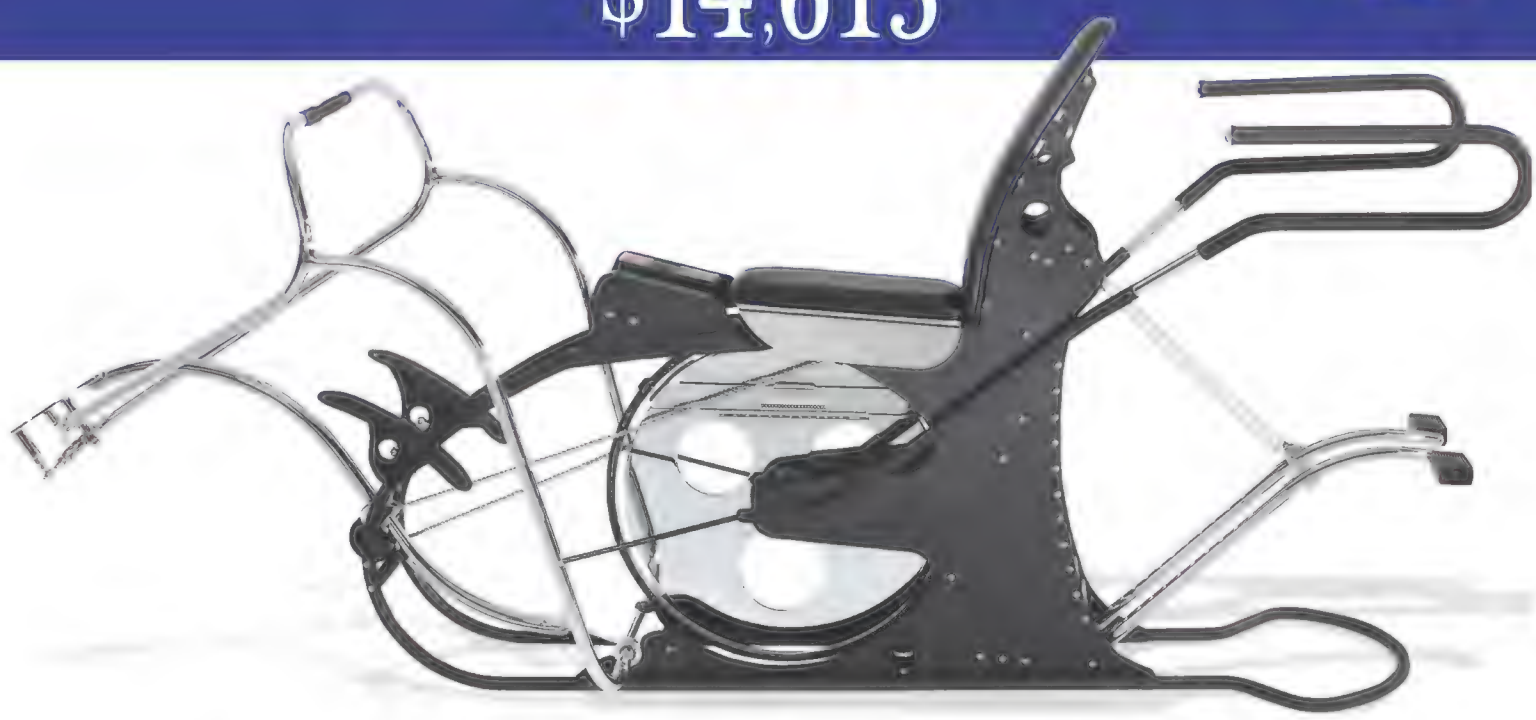

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7. Being ignored and ridiculed by the friends who think you've lost your mind.
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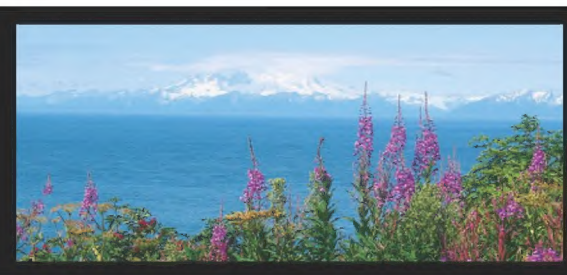

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It is certainly entertaining, often funny, even awe-inspiring at times, as befits the subject matter. But clear introductions to essential principles of physics abound throughout these lectures, including density, quantum theory, gravity, and even the General Theory of Relativity. And Dr. Tyson also includes forays into disciplines such as chemistry and biology as needed to explain events.

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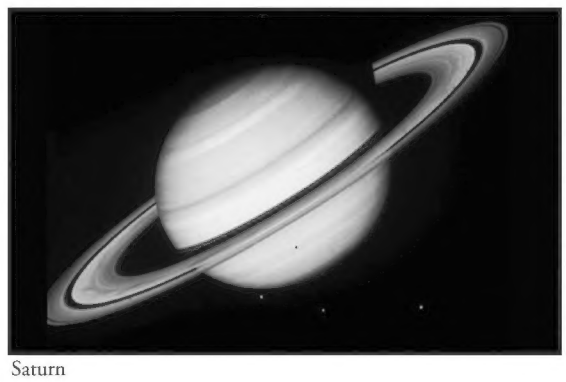

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As Dr. Tyson notes, we are made of stardust, just as the planets are. And he has created a course that explains exactly how that came to be, beginning with a grounding in the basic "machinery" of matter, forces, and energy which reveals itself throughout the universe.

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Dog Daze

"X Files" with the bark off

BY SIMON RICH

HERE ARE SOME SCENES for a TV show I came up with that's exactly like "The X Files" except all of the characters are dogs.

REX: Thank God you're here. I didn't know who else to turn to. No one believes my story.

DOG SCULLY: Tell us what happened.

REX: I used to go into the living room every day. I'd run around, scratch up the couches—you know, have a good time. Then, yesterday, I went inside and all of a sudden a horrible electric shock shot through my entire body.

DOG MULDER: Unbelievable.

DOG SCULLY: Did you try going in again today?

REX: Yes. The same thing happened. I don't even want to go into that room anymore.

DOG MULDER: Wow. I have no explanation.

■

DOG MULDER: I'm Agent Mulder from the Dog FBI. Tell us what happened.

SKIP: Last week, my face was really itchy. I kept trying to scratch my nose, but . . . I couldn't reach it.

DOG MULDER: What do you mean?

SKIP: There was some kind of cone-shaped force field surrounding my head.

DOG SCULLY: Incredible!

SKIP: The crazy thing is, three days later, I fell asleep . . . and when I woke up, the force field was gone.

DOG SCULLY: I don't understand. This defies all logic!

DOG MULDER: Not everything can be explained with logic, Dog Scully.

■

BOOMER: This is really hard for me. You're the first ones I've told.

DOG SCULLY: Tell us what happened. Maybe we can help.

BOOMER: OK, here goes. Yesterday I fell asleep, and when I woke up, my testicles were missing.

DOG SCULLY: Jesus. This is the fifth case this month.

DOG MULDER: There's something happening out there. Something beyond our understanding.

■

ROCKET: I used to have fleas all over my body. Thousands and thousands of them. Then, yesterday, I felt a tightness around my neck . . . and within hours the fleas were gone.

DOG MULDER: (Spits out coffee.)

DOG SCULLY: For years, I've tried to be a scientist, to live by the rules of logic and reason. But now I don't know what to believe.

DOG MULDER: Please use your magic to kill my fleas. ○

RICHARD THOMPSON

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